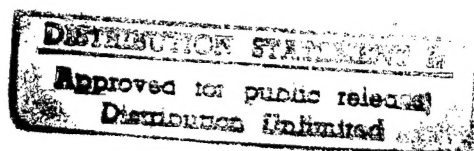


JPRS Report

Science & Technology

USSR: Life Sciences



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UDC 613.6:656.7]:[615.471:615.825

Possibilities of Using Flight Simulators in Dynamic Medical Observation of Flight Crew

907C0443A Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 11, Nov 89 pp 51-55

[Article by Prof V. A. Bodrov and Lt Col Med Serv V. V. Kharin, candidate of medical sciences]

[Abstract] Practical recommendations obtained from experimental studies on pilots with functional diseases of the nervous system and cardiovascular system are suggested to further expand the occupational skills of the flight physician, who can use psychophysiological data not only when assessing flight readiness, but also in treatment and prevention work with a flight crew. A number of psychophysiological mechanisms were isolated that are important from the standpoint of the regulation of flight activity and resistance to stress factors. Disruption of those mechanisms in functional disorders can be identified through the use of the flight simulator. Occupational stress tests that are used for testing psychophysiological mechanisms on a simulated flight are based on the basic elements of simulator training, and their performance do not require any additional professional skills that are specific to any particular type of aircraft. It is recommended that the occupational stress tests be used on the simulator for early diagnosis of functional disorders associated with the occupational problems of pilots, for evaluation of the occupational fitness and psychophysiological reactions of pilots with functional diseases, and for analysis of the possible connection of poor pilot performance in flight and an individual's psychophysiological traits. The results of occupational stress test may be used to plan measures for increasing combat effectiveness and flight safety while maintaining the occupational health of the flight crew. References 15 (Russian).

UDC 629.78.046:613.2

Feeding the Salyut-7 Crews

907C0238A Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 23 No 4, Jul-Aug 89 (Manuscript received 31 Mar 88) pp 9-14

[Article by V. P. Bychkov, S. Kalandarov, A. N. Agureyev, I. G. Popov, A. N. Kochetkova, A. S. Ushakov]

[Abstract] The food products developed for the Salyut-7 crews consists primarily of dehydrated products to be rehydrated with hot or cold water before consumption. They are to be served in four meals a day on a six-day menu. The daily ration contains approximately 130 g protein, 120 g fat, 360 g carbohydrates, for a total of 3,000 calories. The crews takes multivitamins twice a day. Over the course of five missions on the orbital craft,

a broad assortment of products and dishes was brought to the crews by the Progress freighters and the Soyuz-T craft, to supplement the regular menu. Those extras included fresh fruits and vegetables, condiments, fruit and berry juices, milk, honey, and newly developed products and dishes being considered for future missions. This article discusses some of the results of a physiological-hygienic evaluation of the food rations supplied to the crews of five long-duration Salyut-7 missions ranging from 126 days to 211 days in length. Analysis of a 68-day preflight test of the rations and of the five missions aboard the Salyut-7 indicated that all components of the food operations functioned as intended and were generally well-thought-of by the cosmonauts. The daily diet kept the cosmonauts strong enough to perform their jobs. The system used to obtain information on the actual consumption of products in flight by each crew member requires some improvement for prompt evaluation of the dynamics of the nutrient status and qualified adjustment of the daily diet by specialists on the ground. The cooking and serving system requires some improvement, particularly automation of the most labor-intensive processes. Figures 1; References 20: 11 Russian, 9 Western.

UDC 629.78:[612.45+612.89

Reaction of Sympathoadrenal System of Cosmonauts After Long Missions on Salyut-7 Orbital Spacecraft

907C0238B Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 23 No 4 Jul-Aug 89 (Manuscript received 17 Nov 87) pp 14-20

[Article by N. A. Davydova, R. Kvetnyanski, A. S. Ushakov, USSR, CSSR]

[Abstract] Because the sympathoadrenal system is an important component of neurohumoral regulation, study of its hormonal and mediator components is particularly important for long-duration spaceflights, when the body is exposed to extreme conditions and the ability to adapt to such conditions determines, to a large extent, the success and completion of the mission. This article utilizes a broad spectrum of sympathoadrenal activity indicators to study catecholamine metabolism in cosmonauts after missions of 211 and 237 days, as well as during the missions. Immediately after the shorter flight, adrenaline, 4-hydroxy-3-methoxymandelic acid, and homovanillic acid levels were higher than preflight levels; noradrenaline, dopamine, DOPA, methanephrene, and normethanephrene levels were lower than preflight levels. Excretion of catecholamines, DOPA, and metabolites gradually rose and, by postflight days 3-6, were considerably higher than preflight levels. None of the indicators normalized until 45 days after the flight. Analysis of the sympathoadrenal activity showed the hormonal component to have been stimulated, with the

adrenaline/noradrenaline ratio twice as high as the pre-flight ratio. The transmitter component activity was inhibited, such that noradrenaline synthesis was low on the day of the landing, after which it gradually rose. Dopamine synthesis behaved in an opposite manner. Blood catecholamines increased slightly on days 217-219 of the 237-day flight, while their content in the urine remained constant and the excretion of metabolites decreased, all parameters increasing significantly following the flight. Figures 3; References 21: 7 Russian, 14 Western.

UDC 629.78:616.153.915-39.092.9-07

Status of Lipid Peroxidation System in Rat Tissues After 7-Day Flight on Kosmos-1667

907C0238E Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 23 No 4 Jul-Aug 89 (Manuscript received 12 Apr 88) pp 34-37

[Article by N. V. Delenyan and A. A. Markin]

[Abstract] A study is made of the levels of lipid peroxidation products (diene conjugates, Schiff bases and malonic dialdehyde), the activity of basic antioxidant enzymes (superoxidismutase, catalysis, glutathione peroxidase, glutathione reductase), and the bioantioxidant tocopherol [vitamin E] in the tissues of rats after a seven-day flight on board the Kosmos-1667 satellite. The data obtained indicated a generalized increase in lipid peroxidation in the livers of the rats, increasing the permeability of cell membranes. Reliable increases were observed in the activity of the cytoplasmic enzyme of the hepatocytes with a simultaneous increase in general antioxidant activity. These changes, plus a milder increase in lipid peroxidation products in the myocardium, indicate that the intensification of lipid peroxidation probably results from the altered gravitation. References 15: 12 Russian, 3 Western.

UDC 629.78:616.152.32/.33-092.9-07

Blood Electrolyte Balance in Dogs Repeatedly Exposed to +G_z Acceleration

907C0238F Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 23 No 4, Jul-Aug 89 (Manuscript received 22 May 88) pp 43-46

[Article by R. A. Vartbaronov, G. D. Glod, I. G. Popov, N. N. Uglova, N. N. Sarycheva, and I. S. Rolik]

[Abstract] A study is made of the dynamics of the concentration of K⁺, Na⁺, Mg⁺⁺ and Ca⁺⁺ in the blood plasma of animals during exposure to the maximum tolerated acceleration +G_z of increasing intensity, as well as the possible antiarrhythmic effect of hypermagnesemia under these conditions. Centrifuge experiments were performed on seven mongrel dogs, with

exposure once or twice per week over a period of five months, with increasing acceleration to the point of appearance of cardiac rhythm disorders. Blood samples were taken two-three days after each acceleration exposure. Hypermagnesemia was achieved by i/m injection of a 25 percent magnesium sulfate solution, dose 0.5 ml/kg. The experiments produced persistent hypermagnesemia and hyperkalemia of a compensatory nature, decreasing the loss of K⁺ ions and increasing acceleration tolerance by 1.5 g. References 23: 16 Russian, 7 Western.

UDC 612.766.2.08:612.128

Influence of Long-Term Antiorthostatic Hypokinesia on Activity of Enzymes Involved in Energy and Plastic Metabolism

907C0238G Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 23 No 4 Jul-Aug 89 (Manuscript received 16 Sep 88) pp 51-55

[Article by I. P. Popova, Ye. G. Vetrova, and T. Ye. Drozdova]

[Abstract] Studies of human blood serum enzyme activity are of interest not only for diagnostic purposes, but also as a method of studying the specifics of human metabolism under extreme conditions. This article presents a dynamic study of the serum activity of enzymes involved in energy and plastic metabolic processes in order to determine changes in the metabolism and to evaluate the corrective effects of a combination of preventive steps used in a 370-day antiorthostatic hypokinesia study. The preventive measures included drugs intended to normalize water-salt, mineral and lipid metabolism, calcium metabolism and the functioning of the pancreas, plus physical exercise in the horizontal position. A reduction in creatine phosphokinase level was observed during the course of the test, as well as decreases in isocitrate and glutamate dehydrogenase and increases in alanine and aspartate aminotransferase, γ-glutamyltransferase and lactate dehydrogenase, all of which returned to the normal levels during the recovery period following the hypokinesia. The preventive measures decreased the drop in creatine phosphokinase, γ-glutamyltransferase and aspartate aminotransferase. References 14: 12 Russian, 2 Western.

UDC 612.846+612.881].06:612.858.014.424

Ocular-Vestibular-Motor Interactions in Experimental Labyrinth Asymmetry

907C0238H Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 23 No 4, Jul-Aug 89 (Manuscript received 05 Jan 88) pp 59-64

[Article by A. A. Repin]

[Abstract] The vestibular apparatus has a particular role in the coordination of movements of the eyes and head

for gaze fixation. Stimulation of the labyrinth by electric current can imitate changes in the vestibular function observed immediately after labyrinthectomy and, in combination with immersion hypokinesia, can stimulate changes characteristic for the acute period of adaptation to weightlessness. This article reports on studies intended to compare the changes in coordination of eye and head movements during trigger and predictive gaze fixation under conditions of experimental labyrinth asymmetry achieved by electrical stimulation. Alteration in the control of head and eye movement were followed by short-term oscillopsia as a result of changes in the gain coefficient of the ocular-vestibular-motor system. Unilateral stimulus of the labyrinths thus caused disorders in the coordination of head and eye movements with both trigger and predictive gaze fixation, reflecting processes of alteration of the excitability of the labyrinths. The altered status of the afferent element of the vestibular apparatus is manifested as disorders in coordination of the motor systems, deterioration and instability of gaze fixation. Figures 3; References 26: 10 Russian, 16 Western.

UDC 613.693:614.891.2

Differential Criterion for Tolerance of a Blow to the Head in Certification of Protective Gear

907C0238J Moscow KOSMICHESKAYA BIOLOGIYA
I AVIAKOSMICHESKAYA MEDITSINA in Russian
Vol 23 No 4 Jul-Aug 89 (Manuscript received
20 May 88) pp 76-79

[Article by A. S. Barer, Yu. G. Konakhevich, L. N. Sholpo, D. A. Kurme, and L. Ya. Leytene]

[Abstract] A probability criterion was previously suggested for certification of pilots' headgear in which the severity of a blow to the head was evaluated in the context of flying conditions, with particular attention devoted to ensuring the pilot's ability to save himself in an emergency situation and survive for an extended period of time in an uninhabited area. The authors sought a more flexible criterion that takes into consideration the specific conditions of an emergency, such as the possibility of timely arrival of assistance. A differential criterion was developed in three stages: selection of clinical parameters for differential evaluation of the effects of a blow to the head; determination of the relationship of clinical signs of head trauma to impact parameters and location; selection of critical parameters of impact trauma for differential evaluation of protective headgear and their certification. The results of the analysis were used to construct regression equations for the probability of various levels of trauma protection as functions of the maximum contact force. Figures 1; References 7: Russian.

UDC 613.693+629.78]:[612.014.47:531.113/114

Predicting the Effect of Linear and Angular Impact Acceleration on Humans

907C0238K Moscow KOSMICHESKAYA BIOLOGIYA
I AVIAKOSMICHESKAYA MEDITSINA in Russian
Vol 23 No 4, Jul-Aug 89 (Manuscript received
02 Aug 88) pp 79-83

[Article by Yu. V. Mazurin and G. P. Stupakov]

[Abstract] Modern methods of optimizing man-machine system interactions require planning of the actions of the operator not only under ordinary conditions of operation of aircraft, but also under extreme conditions and emergency situations in which the operator may be exposed to high levels of linear and angular acceleration. This article describes a method for computer prediction of the probability of injury to individual subsystems of the body, as well as changes in activity, physiological responses, and subjective estimates of tolerance. The method is a combination of traditional methods of estimating the danger of injury in impact acceleration, and it is based on determination of statistical relationships between biomechanical and other effects described in a mathematical model of the human body. A flow chart of the algorithm employed is presented. The method enables expansion of the list of predicted effects and evaluation of the tolerance of complex actions. It decreases the demands for the degree of identification of parameters of the mathematical model and increases the flexibility of simulations, allowing modern methods to be used for the accumulation and statistical processing of biomedical information and mathematical modeling to assure safety and continued efficiency of aircraft crews. Figures 4; References 4: 3 Russian, 1 Western.

UDC 629.78.07:517.983

Analysis of Methods of Presenting Information to an Operator in the Control Process

907C0238L Moscow KOSMICHESKAYA BIOLOGIYA
I AVIAKOSMICHESKAYA MEDITSINA in Russian
Vol 23 No 4, Jul-Aug 89 (Manuscript received
28 Jun 88) pp 83-85

[Article by Yu. P. Yablonko and V. F. Anishchenko]

[Abstract] In the sensomotor-based control systems widely used in aircraft and spacecraft it is very important that the choice of information models for determination of the effectiveness criterion of operators' actions be sound. This article studies a system for controlling a dynamic object. The system includes the object of the control, digital and analog parameter indicators, a manual control device. The objective for the operator in the study is to move the object of control from one state to another. Two methods of display of controlled parameters are used: a cathode-ray tube illustrating the status

of the controlled object by the position of a symbol on the screen; and digital indicators reflecting the values of state criteria. An information approach to analysis of the control process examines the change in entropy of the object of control. The rate of change is characterized by the information flow acting on the operator during the performance of control tasks with various display devices. The approach enables quantitative estimation

of the information load on the operator, and the information flow can be used as a characteristic of the operator's throughput capacity. The distribution of information flow depends on the method by which the information is presented. When working with an analog indicator, an operator can perceive a greater quantity of information per unit time than when a digital indicator is used. Figures 3; References 2: Russian.

UDC 633.11:631.524.86:632.4.097.3

Interspecies Hybridization in Transfer of Stem Rust Resistance in Wheat

907C0747A Moscow SELSKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 1, Jan-Feb 90 (manuscript received 27 Oct 87) pp 65-71

[Article by V. F. Kozlovskaya, L. P. Grigoryeva, and N. V. Shatilova, "Niva Alataya" Scientific Industrial Association, Barnaul]

[Abstract] Interspecies hybridization studies were conducted to assess introgression of stem rust resistance from *Triticum boeoticum* and *T. timopheevii* to *T. durum*. Evaluation of F_3BC_1 - F_5BC_1 hybrids derived from F_1BC_1 (*T. durum* x *T. boeoticum*) seeds provided evidence of dominant monofactorial control of immunity. In the case of $F_2(F_1BC_1$ - $F_4(F_1BC_1$ (*T. durum* x *T. timopheevii*) hybrids the inheritance situation was more ambiguous; nevertheless, successful introgression was demonstrated in a derived line that exhibited *T. durum* phenotype. Tables 3; references 9: 8 Russian, 1 Western.

UDC 581.132

Isolation, Fractionation, and Cultivation of Cotton Microspores

907C0732G Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 311 No 4, Apr 90 (manuscript received 7 Jun 89) pp 1020-1023

[Article by A. M. Turayev, A. N. Mun, Z. B. Shamina, and R. G. Butenko, corresponding member, USSR Academy of Sciences, Moscow State University imeni M. V. Lomonosov; Institute of Plant Physiology imeni K. A. Timiryazev, USSR Academy of Sciences, Moscow]

[Abstract] Studies were conducted on the isolation, fractionation, and cultivation of cotton (*G. hirsutum*, line L-501, dominant dwarf) microspores (P grains) to expand the experience currently available only for tobacco plants. The intention was to devise a means of inducing sporophytic development of embryogenic cotton microspores capable of eventually yielding haploid plants. A schematic outline is provided of the various steps, beginning at the flower bud stage, and including isolation and fractionation on Percoll [sic] + 0.4 M mannitol solution gradient and cultivation of the various fractions on N_6 medium with 9 percent sucrose. Viability approximately 70 percent, indicating that further studies on cultivation of cotton microspores, using somatic anther tissue medium, are warranted. Figures 2 tables 2; references 8 (Western).

UDC 631.524.85:633.11"324"

Variable Productivity of Winter Wheat Varieties Under Dry Conditions

907C0196A Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 3, May-Jun 89 pp 10-12

[Article by A. F. Sukhorukov, Kuybyshev Scientific Research Institute of Agriculture imeni N. M. Tulaykov]

[Abstract] The problem of increasing the drought resistance of grains is one of the most pressing for the steppe regions of the USSR. Under extreme drought conditions, Volga steppe and southern steppe varieties form their harvest largely through the great density of the stand of productive stems, while southern Ukraine groups—and particularly southern varieties of northern Caucasus groups—depend upon increased productivity of the main ear rather than bushiness. Studies have shown that Volga steppe and forested-steppe ecological group varieties included in the gene pool of winter wheat lose a great deal of productivity of their ears because of late ear formation under dry conditions, indicating the difficulty of combining good cold-weather resistance and good drought resistance. The first step in solving this difficult problem is the creation at the Kinel'skaya selection station of a highly cold resistant variety, Kinel'skaya 4, which also has good drought resistance. In 1984, the new variety Kuybyshevka, created jointly by the Kuybyshev Scientific Research Institute of Agriculture and the Krasnodar Scientific Research Institute of Agriculture, was found superior to Mironovskaya 808 in terms of the number of grains per ear by 13 percent and in terms of mass of grain per ear by 40 percent; in 1986, the mass was greater by 45 percent. Kuybyshevka was found to have superior cold and winter resistance. In the southeastern USSR, drought was found to decrease the height of the plants and the size of almost all productivity elements of winter wheat. The degree of this reduction depends on weather conditions during development stages. The productivity of winter wheat in dry years in the central Volga area decreases mainly as the result of a decrease in the density of productive stems, number of grains per ear and grain mass (1000 grains). The phenotypic variability of the number of grains per ear is slight. Late-heading varieties of winter wheat decrease the productivity of each ear in dry years more than do early-heading varieties.

UDC 633.16"321:324":631.526.32

Karabakh 7

907C0196B Moscow SELEKTSIYA I SEMENOVODSTVO in Russian No 3, May-Jun 89 pp 34-35

[Article by A. D. Musayev, G. S. Guseynov, candidates of agricultural sciences, D. K. Gashimov, candidate of biological sciences, Azerbaijan Scientific Research Institute of Agriculture]

[Abstract] The Karabakh 7 variety of barley was developed at the Mir-Bashirskaya zonal experimental station of the Azerbaijan Scientific Research Institute of Agriculture by repeated selection from specimen k-20909 supplied by Belgium. It has been regionalized since 1908 in zones I, II and VII of the Azerbaijan SSSR. It is a short-stem variety, an intensive type responsive to intensified agriculture. Field testing has indicated its superior harvest when planted at the normal time or when planted late.

UDC 633.256:631.536.32

Toros

907C0196C Moscow SELEKTSIYA I
SEMENOVODSTVO in Russian No 3, May-Jun 89
pp 35-37

[Article by V. P. Chepelev, candidate of agricultural sciences, A. I. Shorokhova, Krasnoufimskaya Experimental-Selection Station]

[Abstract] The purpose of this study, performed in 1982-1987, was to determine the reaction of the Toros variety of spring barley, regionalized in 1987, to the soils of the region, which differ considerably in their natural fertility, mechanical composition and agrochemical characteristics. Normal cultivation techniques were used. Optimal conditions were found to be a planting rate of four million seeds per hectare, yielding at least 500 plants per square meter. Denser planting causes a decrease in yield. Sparser planting lengthens the vegetation period and decreases grain quality. Under the optimal conditions with intensive cultivation a yield of four tons per hectare can be reliably achieved.

UDC 633.12:631.524.86(571.63)

Resistance of Buckwheat Varieties to Fusariosis and Aschochitosis

907C0195A Moscow SELEKTSIYA I
SEMENOVODSTVO in Russian No 4, Jul-Aug 89 p 30

[Article by T. V. Nagayskaya, junior scientific associate, Maritime Kray Scientific Research Institute of Agriculture]

[Abstract] Several species associated with fusariosis (especially *Fusarium oxysporum* Schlecht, *F. solani*

(Mart) Appel et Wr., *F. moniliforme* Sheld., *F. heterosporum* Nees.) have been found on selection sowings of the Maritime Kray Scientific Research Institute of Agriculture in recent years, and aschochitosis (*Ascochyta fagopyri*) has been found on buckwheat sowings. A study of the degree of infection by these diseases from 1983-1987 revealed the Soviet and foreign varieties most susceptible to these diseases. An epiphytosis of aschochitosis in 1985 attacked almost all samples studied. The 1986-1987 studies showed that only three varieties in the new collection were resistant to these diseases. Susceptibility to fusariosis and aschochitosis of Primorskaya 239 was 21.6 percent and 25.0 percent, respectively; that of Primorskaya 235 was 22.0 percent and 25.0 percent; and that of Primorskaya 237 was 24.0 percent and 25.0 percent. Susceptibility of the local standard variety was 27.6 percent and 30.0 percent. The assessment of the buckwheat varieties to the diseases provided valuable additional material to their general characteristics. The resistant varieties may be used as starting material in development of new highly productive varieties which are resistant to these pathogens.

UDC 633.11:631.526.32

New Variety of Winter Hard Wheat, Mirbashirskaya 50

907C0195B Moscow SELEKTSIYA I
SEMENOVODSTVO in Russian No 4, Jul-Aug 89
pp 39-40

[Article by A. D. Musayev, V. F. Ibadov and M. G. Seidov, Azerbaijan Scientific Research Institute of Agriculture]

[Abstract] Mirbashirskaya 50 was bred at the Azerbaijan Scientific Research Institute of Agriculture by interspecies hybridization (Pabellon 67 from Mexico X Shark) with subsequent individual selection. Since 1988, it has been regionalized for I, II, III, IV and VIII zones of AzSSR. The variety and its growing conditions were described. The variety combines economically valuable characters of the parental forms, high productivity, drought resistance and resistance to disease and lodging. Planting procedures and seed-growing instruction were described briefly.

UDC 577.152.314.14

Establishment of Specificity of Restriction Endonuclease Bse 21 I

907C0663C Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKIKH NAUK in Russian No 1, Apr 90 pp 138-139

[Article by S. Kh. Degtyarev, A. A. Kolykhalov, V. Ye. Repin et al; All-Union Scientific Research Institute of Molecular Biology, NPO "Vektor", USSR Ministry of the Medical and Biological Industry, Koltsovo]

[Abstract] A study of bacterial strains isolated from natural isolates revealed the strain *Bacillus species* 21, from which was isolated restrictase endonuclease Bse 21 I. Restrictase Bse 21 I recognizes the sequence CCTNAGG with the cleavage point between C and T. Restrictase Bse 21 I is an isoschizomer of Sau I and may be used extensively in structural and functional studies of DNA. Figure 1; references 4 (Western).

UDC 576.8.078.2:547.96:616-001.8

Identification of Special Hypoxic Proteins in Human Lymphocytes

907C0732C Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 311 No 4, Apr 90 (manuscript received 4 Aug 89) pp 989-990

[Article by K. A. Agibetov, A. A. Aldashev, and A. A. Yugay, Kirghiz Scientific Research Institute of Cardiology, Frunze]

[Abstract] Screening studies were conducted with human lymphocytes to determine whether special proteins are synthesized in response to a hypoxic shock. ³⁵S-Methionine incorporation studies showed that cultivation of the lymphocytes in minimal Eagle's medium at 37°C in a gas mixture consisting of 3.5 percent O₂, 5 percent CO₂ and 91.5 percent N₂ for 3 h resulted in the synthesis of two unique proteins which were localized to the cytosol. The major protein component was represented by a 37 kD protein with an isoelectric point pI of 3.5-4.0, while the minor component had a molecular weight of 76 kD. These proteins were present in only trace quantities under normal conditions of incubation (21 percent O₂), and differed from classical heat shock proteins. Figures 2; references 7 (Western).

UDC 547.962:547.63

Structural Organization of Met-Enkephalin and Endorphin Molecules. Part 2. Theoretical Conformational Analysis of A-, T- and E-Endorphins

907C0836E Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 16 No 5, May 90 (manuscript received 12 Apr 89; in final form 19 Jul 89) pp 649-660

[Article by Ye. V. Suleymanova, N. M. Godzhayev, N. A. Akhmedov and Ye. M. Popov*, Azerbaijan State

University imeni S. M. Kirov, Baku; *All-Union Correspondence Institute of the Food Industry, Moscow]

[Abstract] A theoretical conformational analysis was conducted on α-, γ- and ε-endorphins, which correspond to amino acid sequences 1-16, 1-17 and 1-19 of β-endorphin, respectively. For purposes of analysis the opiopeptides were resolved into smaller fragments to assess the most favorable conformations in thermodynamic terms. The resultant finding were tabulated and revealed transitions in packing in going from α - γ - ε peptides. The data may be utilized in calculations on energetically favored conformations of β-endorphin. Figures 1; tables 6; references 9: 4 Russian, 5 Western.

UDC 612.351.11:577.152.112].063

Induction of Cytochrome P-455 in Mouse Liver Microsomes by Perfluorodecalin

907C0280C Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 8, Aug 89 pp 164-166

[Article by N. V. Adrianov, A. I. Archakov and M. Tsigler, Chair of Biochemistry, 2nd Moscow Medical Institute imeni N. I. Pirogov]

[Abstract] Experiments on CBA line mice (weight 25-35 g) kept at 24° with free access to food and water involved intraperitoneal injection of sodium phenobarbital (100 mg/kg) in a 0.9 percent solution of NaCl and perfluorodecalin (0.03-1 ml/kg) in liposomes from phosphatidylcholine. Peak cytochrome P-450 induction occurred 48 hours after perfluorodecalin injection. Cytochrome P-450 level increased 4-fold after a 0.6 ml/kg injection of perfluorodecalin in homogenate and 6-fold after injection of a 0.4 ml/kg dose in microsomes. Phenobarbital and perfluorodecalin induced several cytochrome P-450 isozymes and revealed a new isozyme with mass of 56 kD not found in microsomes of intact CBA mice. Perfluorodecalin induction greatly increased the rate of NADPH-dependent aminopyrine nN-demethylation (6-7-fold per mg of microsomal protein and 1.5-fold per nmol of cytochrome P-450). Perfluorodecalin is a more powerful inducer of the monooxygenase system than phenobarbital. Figure 1; references 13: 6 Russian; 7 Western.

UDC 577.181.5:579.222.3+577.112.083:582.282.232

Killer Protein Formed by Hansenula Anomala (Hansen) H. Et P. Sydow

907C0156B Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 308 No 5 Oct 89 (Manuscript received 09 Feb 89) pp 1251-1255

[Article by M. M. Vustin, T. M. Shemyakina, B. A. Rebentish, M. A. Byuchkova, S. I. Kharitonov, S. V. Belyeyev, Ye. A. Timokhina, S. P. Sinekiy, All-Union Scientific Research Institute of Genetics and Selection of

Commercial Microorganisms; Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] Recent studies have reported the isolation of two strains of halophilic yeast with clear anti-yeast activity. The authors have performed similar studies on other strains of *H. anomala* isolated from soils and tree sap. Antibiotic activity was evaluated based on the size

of the zone of suppressed growth of test cultures of *Candida tenuis*. A new killer protein with a broad spectrum of yeast-suppressing activity was isolated, purified and described. The protein is active over a broad pH range and is quite thermally stable. It is assumed that *H. anomala* yeasts have several protein antibiotics, which is quite interesting from the scientific and practical standpoints. Figures 2; References 11: 5 Russian, 6 Western.

UDC 551.46.07:591.512

Bionic Model of Active Electrolocation in Fish

907C0732B Moscow DOKLADY AKADEMII NAUK
SSSR in Russian Vol 311 No 4, Apr 90 (manuscript
received 22 May 89) pp 984-988

[Article by Yu. B. Shaub and A. V. Khodzevich, Pacific
Oceanologic Institute, Far Eastern Division, USSR
Academy of Sciences, Vladivostok]

[Abstract] Currently, description of electrolocation in fish has been largely qualitative. The essential features of this phenomenon are that a pulsatile field is generated around the fish; distortions in the field by a foreign object with a different conductivity than that of water and their perception by specialized receptors forms the basis of electrolocation. Accordingly, a mathematical rationale is provided for a bionic model for active electrolocation, which encompasses such parameters as generation of the primary field, detection of reflected signals, and information processing to derive data on target coordinates. Accordingly, a series of five equations were derived for determination of the x, y, and z coordinates of the target object and the modulus of the dipole moment. Figures 3; references 7 (Russian).

UDC 577.3

**Influence of Temperature on Electron Transfer
From Multiheme Cytochrome C To
Photosynthesis Reaction Center**

907C0156A Moscow DOKLADY AKADEMII NAUK
SSSR in Russian Vol 308 No 5 Oct 89 (Manuscript
received 20 Feb 89) pp 1247-1250

[Article by Ya. Sabo, A. A. Kononenko, N. I. Zakharova,
S. K. Chamorovskiy, A. B. Rubin, Moscow State Uni-
versity imeni M. V. Lomonosov]

[Abstract] Data have been recently obtained on the three-dimensional structure of the protein of the photosynthesis reaction center of purple bacteria which, with kinetic data on the reactions of electron transfer between chromophore groups of the reaction center and data on the influence of the molecular dynamics of protein on these processes, create the prerequisites for constructing a quantitative theory describing the processes of energy conversion in the reaction center upon absorption of a quantum of light. Results are presented in this paper from a study of the influence of temperature on the rate of photoinduced electron transfer from multiheme cytochrome C to a bacteriochlorophyll dimer in isolated reaction centers from photosynthesizing bacteria C. minutissimum under conditions such that photoinduced oxidation occurs preferentially for one, two or more hemes. The reaction centers studied are found to have two high-potential hemes with the corresponding redox potentials. In the range of oxidation-reduction potentials of the medium of +300 to +440 mV, only one heme is preferentially reduced, while in the range of potentials of +240 to +310 mV two hemes are reduced. At lower redox potentials three, then four hemes are reduced. Figures 2; References 15: 3 Russian, 12 Western.

UDC 636/639:591.3:57.086.835

Cell Engineering With Preimplantation Embryos of Farm Animals*907C0747B Moscow SELSKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 2, Mar-Apr 90 (manuscript received 12 Aug 88) pp 51-55*

[Article by V. I. Zakharchenko and M. I. Prokofyev, All-Union Scientific Research Institute of Agricultural Biotechnology, Moscow]

[Abstract] Cell engineering studies with 7-8 (Group I) and 9-11 (Group II) day-old bovine preimplantation embryos demonstrated that their bisection resulted in the regeneration of the morula-blastocyst stage in 92.1 and 91.8 percent of the cases, respectively. Repeated bisection of the latter and incubation under appropriate in vitro conditions for 16-20 h again resulted in morula and blastocyst formation in 67.6 percent of the cases originally derived from the 7-8 day embryos, and in 100 percent of the cases from the 9-11 day embryos. In addition, studies with zygotes at the pronucleus stage derived from Soviet chinchilla and New Zealand rabbits showed that development to the morula-blastocyst stage was possible in 44.7-61.3 percent of the cases following microsurgical removal of the male pronucleus. The success of such investigations opens new vistas in the engineering of commercially important farm animals. Tables 2; references 11 (Western).

UDC 581.143.6:615.4

Accumulation of Panaxosides in Cell Cultures of Panax Ginseng C. A. Mey Transformed by Agrobacterium Rhizogenes*907C0732F Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 311 No 4, Apr 90 (manuscript received 29 Sep 89) pp 1017-1019*

[Article by Yu. N. Zhuravlev, V. P. Bulgakov, L. A. Moroz, N. I. Uvarova, V. V. Makhankov, G. V. Malinovskaya, A. A. Artyukov and G. B. Yelyakov, Academician, Soil Biology Institute, Far Eastern Division, USSR Academy of Sciences, Vladivostok]

[Abstract] Trials were conducted to determine whether the low yields of panaxosides from cell cultures of ginseng (*Panax ginseng* C. A. Mey) could be improved by transformation with *Agrobacterium rhizogenes* strains A₄ and 15834. Callus cultures derived from control and transformed stems and roots were extracted with 70 percent methanol and analyzed for panaxoside content. The results demonstrated that transformed cultures synthesized considerably more panaxosides than control cultures, reaching in some cultures 3.32 mg/g of dry biomass, or 50 percent of intact root content. In general, better results were obtained by injection of the stems with A. *rhizogenes* A₄ than with A. *rhizogenes* 15834. These findings point to the potential use of transformed

ginseng cell cultures for the production of panaxosides. Tables 1; references 9: 2 Russian, 7 Western.

UDC 615.373:578.245].07

Experimental Assessment of Recombinant Human Interferon- Γ with Proteolytically Shortened C-Terminus*907C0769E Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 3, Mar 90 (manuscript received 14 Feb 89) pp 89-93*

[Article by A. A. Vorobyev, V. A.-V. Bumyalis, S. A. Tsarev, S. G. Arsenyan, V. A. Parfenov, D. V. Paulauskas, A. V. Klenova, L. A. Denisov, M. M. Mauritsas, V. D. Koltsov, L. I. Petrova, I. V. Dudich, Ye. I. Dudich, R. I. Masilyunayte, V. I. Marchenko and A.-E. A. Yanulaytis, 1st Moscow Medical Institute imeni I. M. Sechenov, USSR Ministry of Health; Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow; "Ferment" Scientific Industrial Association (Vilnyus) and Institute of Immunology (Moscow Oblast), USSR Ministry of Medical and Microbiological Industry]

[Abstract] Extensive physicochemical and biological studies were performed on recombinant human IFN- γ (rHu IFN- γ) produced by *E. coli* MH-1-trp-2. Analytical studies demonstrated that rHu IFN- γ was a 15 kD molecule that shared the biological activities of the native IFN- γ molecule, an 18 kD entity, but was far less potent in a variety of biological testing systems. rHu IFN- γ was obtained with 99 percent purity, possessed a pI of 9.6, and sustained a loss of part of the C-end due to trypsin-line action in the course of *E. coli* disintegration. The latter interpretation is supported by the fact that lys-arg and arg-arg sites, on which trypsin acts, are located on the C-end of the IFN- γ molecule. The diminished biological activity of rHu IFN- γ was, accordingly, attributed to the absence or distortion of certain receptor binding sites. Figures 4; references 16: 2 Russian, 14 Western.

UDC 579.266.2:579.255].08

Cloning α -Amylase Gene of *Bacillus Amyloliquefaciens* in Cyanobacteria Cells*907C0302A Moscow MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 9, Sep 89 pp 7-11*

[Article by I. V. Yelanskaya and I. B. Morzunova, Chair of Genetics and Selection, Moscow State University imeni M. V. Lomonosov]

[Abstract] A convenient model for study of expression of bacillus genes is the secretory enzyme α -amylase from *Bacillus amyloliquefaciens* A50, which is readily seen in cells producing it. A previously constructed integrative vector pIAH4 was used in this study to clone the gene of

α -amylase *B. amyloliquefaciens* in cells of cyanobacterium *Anacystis nidulans* R2. This vector contains a fragment of chromosomal DNA of *A. nidulans* R2 in the vectoral plasmid pACYC184 and can be incorporated into the cyanobacterium chromosome by the mechanism of homogeneous recombination. The gene of α -amylase from *B. amyloliquefaciens* cloned in the composition of the integrative vector pIAH4 was incorporated during transformation into the chromosome of *A. nidulans* and was expressed in the cyanobacteria cells. The system of secretion of cyanobacteria *A. nidulans* can recognize signals coded in the structure of *B. amyloliquefaciens*, and α -amylase was secreted through the cell membrane into the periplasmatic region. The recombinant plasmids of the plasmid series pIAH4amy, obtained in the study, may be used to construct vectors of secretion for cyanobacteria. Figures 2; references 16: 5 Russian; 11 Western.

UDC 577.212.3.08

Phased Polylinker for Gene Cloning and Expression

907C0302B Moscow MOLEKULYARNAYA
GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA
in Russian No 9, Sep 89 pp 28-33

[Article by V. A. Karpov, V. G. Lunin and T. I. Tikhonenko, All-Union Scientific Research Institute of Agricultural Biotechnology; All-Union Order of Lenin Academy of Agricultural Sciences imeni V. I. Lenin

[Abstract] One of the trends seen during creation of vector systems is the construction of vectors containing, in the selection zone, a large number of unique recognition segments for propagated restrictases. That shows the promise of use, for cloning, of polylinker systems which represent chemically synthesized oligonucleotides containing a maximum number of recognition segments for site-specific endonucleases propagated. Synthesis of 15 oligodeoxynucleotides by the phosphotriester method preceded enzyme ligation in the polylinker and subsequent phasing of the left and right sides. Creation of vectors for cloning and expressing genes were constructed on the basis of the phased polylinker system. The constructed vectors of the pRK series contain all three variants of the polylinker in both orientations. The polylinker sequences did not affect the enzymic activity of the beta-galactoside α -peptide. Structure of the phased polylinker was confirmed by the A. Maxam and W. Gilbert sequencing methods. Figures 3; references 13: 2 Russian; 11 Western.

UDC 578.891:578.74]:577.213.3

Synthesis and Expression of DNA Fragments Coding for Epitopes of Surface Antigen of Hepatitis B Virus in Escherichia Coli Cells

907C0302C Moscow MOLEKULYARNAYA
GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA
in Russian No 9, Sep 8 pp 39-42

[Article by O. V. Sergiyenko, V. G. Lunin, V. D. Smirnov and T. I. Tikhonenko, All-Union Scientific Research

Institute of Agricultural Biotechnology; All-Union Order of Lenin Academy of Agricultural Sciences imeni V. I. Lenin; Scientific Research Institute of Medical Enzymology, USSR Academy of Medical Sciences; Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] Chemical-enzymic synthesis of polynucleotide duplexes A and B, cloning of them and expression of hybrid proteins containing sequences 93-109 and 125-151 of HBsAG in *E. coli* cells was described and discussed. The primary structure of the duplexes was planned on the basis of data in the literature concerning the effectiveness of various codons in *E. coli*. Expression of synthetic nucleotides A, B and C, coding for HBsAg epitopes was studied in the composition of a cro-lacZ-hybrid found in the pCRL plasmid constructed previously. Chimeric proteins had the expected molecular mass (120 kD). The level of expression of cro-lacZ-hybrid was 10 percent of the total protein. The level of expression of croC-lacZ-protein containing a hydrophobic section interacting with the cell membrane was somewhat lower. Immunological study was performed on croA-lacZ-hybrid, obtained in an acellular conjugated transcription-translation system. It was assumed that, in the hybrid proteins containing sequences A (and B), there are recognition segments of protease La, which, as with the protein studied, is induced at 32°C.

UDC 581.143.6:633.511

Cytogenic Variability of Cotton Callus Tissue Cells

907C0283A Kiev BIOPOLIMERY I KLETKA
in Russian Vol 5 No 5, Sep-Oct 89 (manuscript received
5 Jul 88) pp 96-99

[Article by O. Ya. Vesmanova, S. N. Zuyeva, and A.-K. E. Ergashev, Institute for Experimental Biology of Plants, UzSSR Academy of Sciences, Tashkent]

[Abstract] Cytological features were studied in hypocotyl callus cells from *Gossypium arboreum* var. *salvini* L. during 16 cell culture passages, each of 21 days duration. The cultures were a homogeneous population of undifferentiated cells with occasional differentiated portions. Isolated, elongated spiral tracheal cells and rings of 5-10 cells were seen in passages 1-2. Vascular bundles were seen in later passages, with their numbers increasing with passage number. Large starch-filled cells were also seen, which became more frequent in later passages. Compact, fine, intensely-staining cells which resembled meristem were encountered, which are probably the morphogenesis zone. Anaphase analysis demonstrated that the number of aberrant cells increased with passage number, with both chromatid and chromosomal aberrations seen. Metaphase analysis revealed genome destabilization, with an increase in tetraploid cells. The high level of heterogeneity in cell composition and chromosome number observed may be due to heterogeneity of the

initial tissue culture cells, particularly in phytohormone levels. Figures 1; references 10: 5 Russian, 5 Western.

UDC 577.21

Cloning of Human ApoA1 Gene and its Expression in Murine Fibroblasts

907C0283b Kiev *BIOPOLIMERY I KLETKA*
in Russian Vol 5 No 5, Sep-Oct 89 (manuscript received
10 Mar 89) pp 105-107

[Article by V. N. Shulzhenko, L. L. Lukash, L. N. Shulyak, Ye. V. Usenko, and V. A. Kordyum, Institute of Molecular Biology and Genetics, UkSSR Academy of Sciences, Kiev; Kharkov Scientific Research Institute of Therapy, UkSSR Ministry of Health]

[Abstract] Because of the involvement of its product in the development of atherosclerosis, the human ApoA1 gene was obtained by screening 300,000 recombinant

phages using a 40-residue oligonucleotide complementary to a fragment of the gene. The PstI-fragment of phage DNA which gave a positive blot hybridization test with the probe was subcloned into the pUC18 plasmid. Restriction mapping demonstrated the identity of the fragment obtained with the ApoA1 gene. Three molecular constructs were used to study expression: pUC18-Apo and pUC18-Apo', containing the ApoA1 gene with its own promoter in different orientations, and pA1-Apo, containing the polylinker promoter RNA-polymerase III at the BamHI site. Transfection of line LTK⁻ mouse fibroblasts was conducted. No ApoA1 product protein was observed in cell lysate. EIA measurement of ApoA1 in culture medium indicated that maximal secretion was seen on days 3-10 after plasmid introduction. Addition of exogenous lipids did not enhance protein secretion. More secretion was obtained from the pA1-Apo construct, indicating that the ApoA1 promoter is weak. Figures 2; references 5: 2 Russian, 3 Western.

UDC 616.993.12-036.22(479.2)

Amebiasis in the Transcaucasus and in Mountain Deserts

907C396B Moscow *ARKHIV PATOLOGII in Russian*
Vol 51 No 10, Oct 89 (manuscript received 29 Nov 88)
pp 70-74

[Article by B. V. Krukovskiy, G. R. Salamov, and V. A. Datsko]

[Abstract] In the USSR, endemic foci of amebiasis are found in the Transcaucasus, Central Asia, and the Maritime Kray. Amebiasis is often also found in northern regions as a result of migration of the population. Three cases of amebiasis recorded at the Tbilisi Hospital are cited. The researchers describe amebiasis as an intestinal infection that affects the cecum, the ascending colon, and, frequently, the liver. In amebiasis, the damage to the intestine is always segmented, and the amebiasis ulcer is round, spreads in the mucosa, expands into the submucosa, and, frequently, penetrates to the peritoneum. Figures 2, references 18: 16 Russian, 2 Western.

UDC 616:98:578.833.29]-02-078.72(571.61)

Rattus Serotype Epidemic Hemorrhagic Fever Virus in Amur Oblast

907C0769C Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian*
No 3, Mar 90 (manuscript received 5 Jan 89) pp 48-52

[Article by N. A. Marunin, I. N. Gavrilovskaya, Ye. A. Gorbachkova, N. S. Apekina, V. A. Fugurnov, K. F. Yakunin, N. G. Burlakova and A. I. Lopatin, Blagoveshchensk Medical Institute; Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow]

[Abstract] Extensive serologic studies relying on indirect immunofluorescent techniques were employed in Amur Oblast to assess viral serotypes responsible for epidemic hemorrhagic fever (EHF.) Studies on the sera of 28 patients revealed antibodies against *Rattus*, *Apodemus* and, in 5 cases, against *Clethrionomys* serotypes. Evaluation of the sera of 42 subjects with EHF in the anamnesis (1-7 years ago) showed 100 percent to be positive against *Rattus*, 71 percent against *Apodemus*, and 7.1 percent against *Clethrionomys* serotypes. Finally, examination of 268 sera from healthy donors showed 4.1 percent to be positive against *Rattus* and 2.2 percent against *Apodemus*. The studies also gave evidence that an as yet unidentified EHF serotype circulates in the region that cross-reacts very weakly with *Rattus* and *Apodemus* antisera. Accordingly, this study led to the first demonstration of the importance of the *Rattus* serotype in EHF epidemiology in the Amur Oblast, as well as raised the index of suspicion of the presence of a novel, distantly related viral serotype. Tables 3; references 12: 7 Russian, 5 Western.

UDC 616.99-084.4(47+57)

Parasitic Diseases in USSR and Tasks Associated With Their Prevention

907C0468A Moscow *MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian* No 5, Sep-Oct 89 (manuscript received 15 May 89) pp 3-10

[Article by V. P. Sergiyev, M. I. Narkevich, G. G. Onishchenko, G. P. Nikolayevskiy, A. A. Frolova, O. F. Bogatyrev, Yu. A. Bochkov, Yu. P. Zhiltsov, Medical Parasitology and Tropical Medicine Institute imeni Ye. I. Martynovskiy, Moscow; Main Epidemiology Administration, USSR Ministry of Health]

[Text] The elevation of the socioeconomic status of the Soviet people and the performance of specific measures for the prevention and control of infectious and parasitic diseases has led to a decline in the number of victims of that pathology.

The morbidity recorded for parasitic diseases, among which helminthiasis accounted for more than 99 percent, decreased from 1977 to 1987 by 31.9 percent—a figure that included a decrease of 51.4 percent for ascariasis, 48.2 percent for trichocephaliasis, and 8.2 percent for hymenolepiasis. The malaria situation is continuing to improve in the remaining foci of the Azerbaijan SSR, Uzbek SSR, and Tajikistan SSR, where 405 cases of the disease were recorded in 1987. However, 1,323 cases of malaria came from abroad into the USSR this year, which creates the danger of the transmission of malaria within the country, especially with the carrier population restored, which is aided greatly by the expansion of irrigated lands, the failure to observe sanitation standards in design and construction, and the use of hydraulic engineering works and reservoirs.

In spite of the advances made in reducing the morbidity of parasitic diseases, some 4.5 million individuals were identified with such diseases throughout the country in 1987, which exceeds the number of cases of viral and bacterial diseases (excluding influenza and acute respiratory diseases) recorded for the same period by a factor of 1.5.

Morbidity associated with parasitic diseases is not uniform throughout the country: its levels are higher in the republics of Central Asia and the Transcaucasus and in Kazakh Soviet Socialist Republic (KazSSR). However, the structure of morbidity in the various republics of the country differs substantially (see figure) [Not reproduced].

Enterobiasis is the most widespread of the parasitic diseases, representing 67.1 percent of the helminthiasis in the USSR (with a morbidity index of 1,082.8 per 100,000 population); on a republic-by-republic basis, it ranges from 44.5 percent in the TaSSR (index of 414.4) to 96.6 percent in the Latvian Soviet Socialist Republic (LaSSR) (index of 1,636.9). Only in the AzSSR and the

Georgian Soviet Socialist Republic (GSSR) is ascariasis more widespread, accounting for 42.1 percent of the parasitic diseases (index of 1,090.7) and 36.6 percent (index of 1,028.5), respectively, as opposed to figures of 29.0 percent (index of 750.1) and 33.4 percent (index of 937.5) for enterobiasis.

Ascariasis is the second most widespread parasitic disease in the USSR at 19.6 percent (index of 261.2), ranging from 1.7 percent in the Estonian Soviet Socialist Republic (ESSR) (index of 31.1) to 42.1 percent in the AzSSR.

Trichocephaliasis ranks No. 3 in the USSR at 7.0 percent (index of 96.3), with a range of 0.1 percent in the ESSR (index of 2.7) to 29.0 percent (index of 815.6) in the GSSR.

Fourth place in the structure of morbidity associated with parasitic diseases is occupied by hymenolepiasis, which accounts for 2.8 percent of parasitic diseases nationwide (morbidity index of 44.4 per 100,000) and ranges from 3.8 percent (index of 38.9) in the KaSSR to 36.0 percent in the UzSSR (index of 381.1). Patients with this helminthiasis are concentrated mainly in the republics of Central Asia.

Opisthorchiasis occupies fifth place in the USSR (2.1 percent) with a morbidity index of 34.0 per 100,000; it ranges from 0.13 percent in Ukrainian Soviet Socialist Republic (UkSSR) (index of 2.2) to 4.3 percent in the

Russian Soviet Federated Socialist Republic (RSFSR) (index of 63.0); in the KaSSR, it is 1.8 percent (index of 18.7).

Other helminthiasis are widespread in certain areas. For example, diphyllbothriasis is second in the ESSR (3.5 percent) among all parasitic diseases, with a morbidity index of 65.6 per 100,000 (morbidity index in the USSR is 13.1). That pathology is also widespread in some areas of the RSFSR.

In the Lithuanian Soviet Socialist Republic (LiSSR), GSSR, Belorussian Soviet Socialist Republic (BSSR), and some oblasts of the RSFSR and UkSSR, trichinosis foci are being recorded; in the GSSR, AzSSR, Moldavian Soviet Socialist Republic (MSSR), TaSSR, UkSSR and RSFSR, foci of ancylostomiasis are being recorded; and in the AzSSR, UzSSR, GSSR, Armenian Soviet Socialist Republic (ArSSR), and Turkmen Soviet Socialist Republic (TuSSR), foci of taenia infections are being recorded. Every year, the USSR records nearly 1,000 cases of the most serious helminthiasis—echinococcosis and alveococcosis.

A multiyear analysis of morbidity indices that are calculated by smoothing with the method of least squares made it possible to determine trends in morbidity associated with ascariasis, trichocephaliasis, and hymenolepiasis for the USSR and for each of the republics for the period of 1977 through 1987 (see table).

Dynamics of Indices of Morbidity per 100,000 Population for Certain Parasitic Diseases (1977-1987)

Republic	Ascariasis		Trichocephaliasis		Hymenolepiasis	
	Average multi-year morbidity index	Rate of growth or decline, in %	Average multi-year morbidity index	Rate of growth or decline, in %	Average multi-year morbidity index	Rate of growth or decline, in %
USSR	420.5	-5.5	148.2	-5.2	46.5	-0.9
RSFSR	225.5	-5.7	28.9	-5.1	8.4	-5.3
UkSSR	640.5	-4.7	259.5	-3.5	3.9	-5.6
BSSR	1,828.2	-5.6	872.0	-5.1	5.5	-9.1
UzSSR	61.1	-5.2	5.7	-4.2	400.2	-1.6
KaSSR	52.4	-2.5	3.7	-7.0	48.9	-3.5
GSSR	2,003.8	-6.8	1,434.5	-6.3	1.7	-8.6
AzSSR	1,385.3	-3.1	749.0	-3.3	35.5	-6.8
LiSSR	629.1	-9.2	348.0	-8.4	2.7	-5.8
MSSR	801.0	-3.8	138.5	-4.8	138.5	-3.6
LaSSR	130.5	-8.2	29.8	-9.4	—	—
KiSSR	195.7	-6.3	1.5	-5.0	155.2	-1.5
TaSSR	187.8	-4.7	47.8	-4.4	315.5	+1.3
ArSSR	1,121.7	-8.0	302.0	-9.1	8.8	-7.5
TuSSR	15.4	-2.3	8.0	-7.7	321.1	+1.8
ESSR	48.3	-6.3	3.0	-6.7	—	—

The morbidity associated with ascariasis is declining everywhere, by an average of 5.5 percent per year

throughout the nation. But in terms of rate of decline in morbidity, a number of republics are lagging seriously

behind the all-Union average: the TuSSR, 2.3 percent; KaSSR, 2.5 percent; AzSSR, 3.1 percent; and MSSR, 3.8 percent.

In a number of republics, the rates of decline in morbidity associated with ascariasis exceed the all-Union average: RSFSR, 5.7 percent; BSSR, 5.6 percent; LiSSR, 9.2 percent; LaSSR, 8.2 percent; ESSR, 6.3 percent; ArSSR, 8.0 percent; and GSSR, 6.8 percent per year.

In most of the union republics, the annual rates of decline in morbidity associated with trichocephaliasis are higher than the all-Union average of 5.2 percent or are on a par with it, with the exception of the AzSSR (where the index is 3.3 percent), the UkSSR (3.5 percent), the UzSSR (4.2 percent), and the TaSSR (4.4 percent). The rates of decline in morbidity associated with hymenolepiasis in the union republics generally exceed the all-Union average (which is -0.9 percent). The exceptions are the TuSSR and TaSSR, where morbidity has shown growths of 1.8 percent and 1.3 percent, respectively.

The analysis did not take into account data on the morbidity associated with enterobiasis and opisthorchiasis, inasmuch as the official recording of opisthorchiasis began in 1983, and more improved methods of diagnosing enterobiasis were introduced in the late 1970s and mid-1980s.

A high level of morbidity associated with parasitic diseases was noted among Soviet citizens who worked in countries with hot climates. During the last three years, selective screenings of people who work in the countries of Asia and Africa (data from the Ministry of Foreign Economic Relations and the Medical Parasitology and Tropical Medicine Institute imeni Ye. I. Martynovskiy) indicate that malaria was diagnosed in 19 percent of those screened and that amebiasis was diagnosed in 17.8 percent. Lab tests showed that 50 percent of the people returning from the People's Democratic Republic of Afghanistan had amebic dysentery. Such high morbidity rates among Soviet citizens temporarily living in countries with hot climates indicates the inadequacy of the medical care rendered to those contingents and presents a real danger in terms of the complication of the epidemic situation by the import of such diseases into the USSR. The number of cases of malaria imported from abroad is more than three times greater than the number of indigenous cases, and the number of imported ancylostomiasis cases is more than 10 times greater than indigenous cases.

Parasitic diseases have a diversely expressed pathological effect on health, especially in children. Marked allegization with helminthiasis is accompanied by immune suppression. Moreover, parasitic diseases contribute to the development of secondary, accompanying noninfectious and infectious diseases, which makes such individuals more susceptible to cholera.³ Certain parasitic diseases are among the main causes of death in AIDS patients.²⁰

Poor memory and absent-mindedness are noted in children with enterobiasis, and grades decline. In one of the schools in Baku, 14.4 percent of ill children received an "unsatisfactory" marks in all subjects, and 2.7 percent received "excellent" grades; among healthy children, 4.2 percent received grades of "unsatisfactory," and 19.9 percent received "excellent" grades. After treatment, grades improved considerably among those previously infected: 5.9 percent received an "unsatisfactory" grades, and 14.8 percent received "excellent" grades.²⁶ Children who are ill form harmful habits, their growth and body weight slow, they miss classes more often, and their mothers miss more than 44 work days per year to care for them.¹⁴

The period for recovery from dysentery, which occurs in those children 2.4 times more often than in noninfected children, is extended by 5-9 days.¹⁵ Acute dysentery changes into a lingering form of the disease with a more serious course and marked appearances of intoxication 1.5 times more often.^{17, 29}

The frequency of toxicoses during pregnancy and weakness during childbirth is twice as high in women with opisthorchiasis.¹⁵ Opisthorchiasis may be considered a pathogenic factor in the formation of chronic typhoid bacteria carriers, who are noted 12.8 times more frequently in that group of patients.^{10, 35} A serious course of bronchial asthma is encountered three times more often in such patients⁶; diabetes mellitus associated with morphological and functional alterations of the pancreas occurs four times more often; and the risk of cancer of the liver and pancreas increases.^{2, 11} Mixed invasion of two or more helminths, which is often observed in the republics of Central Asia and the Transcaucasus inflicts greater damage to children's health. The carbohydrate, protein-forming, antitoxic, and prothrombin functions of the liver are disturbed in such children.^{18, 30} Hepatitis develops three times more often against a backdrop of Opisthorchis-Giardia invasion, and a more serious course of hepatitis is observed.⁷

The frequency of acute intestinal infections (AII) increases as the number of invasions increases. For example, if the frequency of AII is 6.6 percent in individuals who have not been infected parasitically, it increases to 8.8 percent in children with one invasion, to 13.5 percent in children with two invasions, and to 25.8 percent in children with three invasions. The recovery periods become longer: by 3.3 days with one invasion, by up to 8 days with two invasions, and by 13.1 days with three invasions. The number of people seeking medical care also increases by a factor of 1.9 for single invasions, 2.2 for two invasions, and 2.3 for three invasions; the duration of temporary disability increases by factors of 2.2, 3.1, and 3.4, respectively.¹⁹

The socioeconomic loss caused just by morbidity associated with helminthiasis was calculated with the method devised by I. L. Shakhnina—it is 1.7 billion rubles per year.

A considerable deterioration of the parasitological situation is observed in areas involving the construction of a number of large national-economy facilities, because the ministries and departments responsible for that work do not allocate the necessary funds for resolving social problems, including the conduct of preventive work. Subsequent treatment of a large number of individuals among those who come in from other regions of the country to do the construction results in a considerable increase in spending from the health care budget.

Violations of the rules attending the formation and isolation of groups in preschool facilities, overcrowding, and failure to observe sanitary and epidemic-control standards in the area associated with the construction of "Atomash" in Volgograd of the Rostov Oblast resulted in almost every one of the children of those associated with the construction becoming infected with enterobiasis.²⁸ The construction workers on the Baikal-Amur Line become sick with helminthiasis three times more often than do the local people. Among those arriving to develop Western Siberia, 20 percent contracted opisthorchiasis in the first year, and up to 40 percent had it by the fifth year.¹ In the Irtysh-Karaganda canal zone, 10 percent of the inhabitants of the construction settlements have opisthorchiasis.³¹

Heavy migration from areas that have undergone economic development leads to the formation of helminthiasis foci in other territories of the country. During the past 15 years of the development of natural resources in the Tyumen Oblast, hundreds of thousands of people infected with opisthorchiasis have left the Tyumen Oblast for permanent residence in other areas.¹⁶ Among those vacationing in the sanatoriums of the UkSSR, 1.8 percent are infected with opisthorchiasis. In Kiev, 87 percent of patients with opisthorchiasis have come from endemic foci of the RSFSR. In light of the fact that local sewage purification works at the resorts and sanatoriums do not completely eliminate helminths from stagnant water, the import of the agent results in the pollution of the environment, which can lead to the formation of parasitic foci.²⁴

Opening up a territory without first studying the epidemic consequences associated with marked ecological changes in the environment often leads to the development of foci of parasitic diseases in areas that were previously not endemic. New foci of diphyllorhynchiasis, with morbidity levels of up to 30 percent of the population, were formed at the Krasnoyarsk and Bratsk reservoirs.^{8, 9, 23} After the Kuibyshev reservoir was filled, morbidity associated with this helminthiasis increased by a factor of 29 among the population of the adjacent settlements,^{21, 25} and it reached 40 percent among the people living near the Kama reservoir.³² Irrigating land in the Chimkent Oblast of the KaSSR, where cutaneous leishmaniasis had not previously been recorded, led to an epidemic, as a result of which 3,000 people became ill in 1988 alone.

Planned, timely implementation of specific prophylactic measures scheduled for as early as the project design stage can, by and large, prevent unfavorable epidemic consequences. For such purposes, it is necessary to draw on the scientific potential of not only the USSR Ministry of Health, but also other scientific institutions in the study of the effects of economic activity on the changes of the parasitological situation.

A major factor in the pollution of the environment with helminth eggs is the discharge of waste water and waste from stock breeding complexes, the amount of which is 100 km³ per year.^{24, 34} The eggs of 15 species of helminths have been found in waste water.^{5, 24} Only 50 percent of the discharged water is subjected to any kind of purification.^{12, 24} Purification structures do not ensure complete dehelminthization. As a result, the water of rivers such as the Don, Volga, and Temernik, as well as a number of reservoirs, are polluted with invasive material. Pollution with helminth eggs was noted in the soil, berries, and vegetables grown on irrigated fields of Kaliningrad, Kiev, Rudniy, etc. Substantial insemination of the soil with helminth eggs has been identified for the following cities: Leningrad, up to 20.5 percent of the samples taken; Moscow, up to 52.5 percent; Kishinev, up to 57.1 percent; Yerevan, up to 42.8 percent; and Irkutsk, up to 49.0 percent. That indicates the regularly scheduled purification is ineffective. At the same time, the sanitation-helminthologic tests performed by the laboratories of the sanitary and epidemiological stations are clearly inadequate. For example, in the Dagestan Autonomous SSR, only 217 soil samples and 104 water samples were tested in 1987. In the AzSSR, such research was conducted in Baku only. Vegetables and fruits in the republic do not undergo regular sanitary tests for helminths. At the same time, spot tests have shown that 12 percent of the greens that were taken from the market and tested, 13 percent of the other vegetables tested, and 12.7 percent of the berries tested contained helminth eggs.

A lack of necessary equipment prevents the parasitological subunits of the sanitary and epidemiological stations from performing the complex of epidemic-control measures and implementing procedural guidelines as specified in the 13 August 1986 order from the USSR Ministry of Health. For example, according to official figures, the subunits have only 50 percent of the fume hoods they need, 33 percent of the microscopes they need, 68 percent of the centrifuges they need, 55 percent of the laboratory glassware they need, 40-50 percent of the chemical reagents they need, and so forth. The lack of fume hoods alone precludes the use of modern high-performance laboratory-diagnosis techniques in which volatile toxic substances are used.

Checks in local areas showed that in the Tyumen Oblast, which is endemic for opisthorchiasis and diphyllorhynchiasis, the 54 sanitary and epidemiological stations have 24 microscopes, 12 centrifuges, and not one operating fume hood. Not one of the sanitary and epidemiological

stations of the TuSSR has even the simplest entomological equipment or fume hood. Fume hoods are in working condition in only 21 of the 38 parasitological laboratories in the Chelyabinsk Oblast, and there are only eight centrifuges. Of the 76 sanitary and epidemiological stations in the Krasnoyarsk Kray, only three of the parasitological laboratories have fume hoods.

The isolation of the laboratories and operational subunits hinders the organization and performance of prophylactic work with respect to parasitic diseases. The performance of laboratory parasitological tests in the bacteriological laboratories of the sanitary and epidemiological stations results in the laboratory technicians performing only the simplest tests; the bacteriologists do not perform such tests, and the parasitologists supervise the work inadequately.

At present, according to the staffing levels specified in a 1969 order, 3,178 parasitologists are supposed to be working in the parasitological subunits of the sanitary and epidemiological stations. In fact, only 2,416 positions exist (76 percent), and only 2,345 are filled. Moreover, 1,634 entomologists are working in the sanitary and epidemiological service of the country.

In some cases, a further reduction in the parasitological subunit staff is taking place as the sanitary and epidemiological service is reorganized (UkSSR, TuSSR, and Khabarovsk). For example, in just four oblasts of the UkSSR, 21 staff units were reduced in a reorganization; they were transferred to other departments of the sanitary and epidemiological stations. As a result, specialists are not being used in their specialties. In the Khabarovsk sanitary and epidemiological station, the parasitological laboratory was closed and the staff of helminthology laboratory technicians was cut back in a centralization move. The day helminthologic infirmaries have been eliminated almost universally, and the remaining ones do not receive the proper guidance from the chief parasitologists and chief infection specialists of their territories. Such a situation has come about because the directors of health care agencies and the sanitary and epidemiological service underestimate the socioeconomic significance of parasitic diseases.

In a number of territories, the planning of prophylactic measures is done without any consideration for the future socioeconomic development of the territories and without including departments of agencies such as municipal services and public education in the work (TuSSR, AzSSR, and Dagestan ASSR). New problems placed before the sanitary service in terms of preventing parasitic diseases are not being considered in connection with the development of the cooperative movement and private work activity, especially with respect to the monitoring of the production and sale of livestock, fish, and vegetable products. For example, cooperative operators in Sverdlovsk Oblast are selling fish that have not been decontaminated of opisthorchiasis, and outbreaks

of trichinosis have occurred in the Ryazan and Moscow Oblasts because of the use in food products of pork from private farms.

Treating physicians have inadequate knowledge of the clinic, treatment, and prevention of parasitic diseases, which leads to serious errors by the physicians.

For example, individuals with visceral leishmaniasis were diagnosed as having leukemia, and their spleens were surgically removed instead of the individuals receiving the necessary treatment with antimony preparations (GSSR, Moscow, and Simferopol Oblast). Two patients with alveococciasis of the lungs died in Moscow because of late diagnosis and incorrect treatment in the tuberculosis institutes of the USSR Academy of Medical Sciences and RSFSR Ministry of Health. An ESSR patient with alveococciasis mistakenly diagnosed as "collagenosis" received corticosteroids and cytostatics, which led to progressive generalization of the process and severe worsening of his condition. As a result of mistakes in diagnosis, there were nine lethal outcomes associated with imported tropical malaria (1986-1988) in Moscow, Leningrad, Arzamas, Kerch, Klaypeda, Novokuznetsk, and the Moscow and Vitebsk oblasts. Serious courses of amebic abscesses of the liver with a lethal outcome that were the fault of doctors who did not know the clinic of parasitic diseases were observed in the Lvov Oblast of the UkSSR and in Moscow.

In a number of places (TuSSR, AzSSR, and the Sakhalin and Tyumen oblasts of the RSFSR), specific treatment is not being prescribed when helminths are detected in hospital patients, because medical workers mistakenly believe that such treatment can be conducted in an infectious department only. Helminthologic diagnosis is not placed on the front page of the hospital patient's chart and is not indicated in the discharge epicrisis, and after release from the hospital, such patients are not transferred to outpatient status in a polyclinic.

The low skill levels of personnel and the inadequate material-technical base of the clinical diagnostic laboratories of the hospitals in the medical parasitology section do not make it possible to conduct diagnostic tests on the proper level (TuSSR and UzSSR). In an active focus of malaria (1982-1987) in the Kayakentskiy Rayon of Dagestan ASSR, screening for malaria is not being performed in the Central Rayon Hospital, because the laboratory technicians of the clinical laboratory are not trained in such techniques. In 1986-1988, transfusions using donor blood resulted in 10 malarial infections.

This situation is a consequence of inadequate knowledge of parasitology on the part of the treating physicians. Medical students are partially familiarized with the most important parasitic diseases in the biology department (first year of medical school) beyond their relationship with clinical manifestations and with laboratory diagnostics and in the department of infectious diseases (fifth year). As a result the graduates are weak in the clinic, diagnosis, therapy, and prophylaxis of parasitoses.

Specialization and advanced training in all aspects of parasitology are concentrated in six institutes for post-graduate medicine, which graduate an average of 500-600 specialist physicians annually, including 170 parasitologists and fewer than 100 entomologists. At present, a parasitologist may come for advanced training once every 13 years, and an entomologist once every 17 years, which is an infraction of the 1981 order of the USSR Ministry of Health.

Highly effective medical preparations are important in the fight against parasitic diseases. The Medical Parasitology and Tropical Medicine Institute imeni Ye. I. Martsinovskiy has synthesized new preparations (medamin, embovin, and azinoks) that are as effective as the imports mebendazole, praziquantel, and pyrantel.

The search for new organization forms for fighting against parasitic diseases is of definite interest. For example, in the MSSR, within the framework of the comprehensive "Zdorovye" [Health] program, program-specific planning of work for the control and prevention of parasitic diseases has been introduced with a definition of the final results.

In examining aspects of the protection of the health of the pediatric population, the College of the MSSR Ministry of Health in 1988 not only assessed the activity of pediatricians in the medical parasitology section, but also placed concrete objectives before them in the diagnosis, treatment, and prophylaxis of parasitic diseases. Day infirmaries are active in the republic, especially those for restoring health in persistent foci of enterobiasis.

Centers for diagnosing and treating echinococcoses have been created in Baku, Anadyr, and Petropavlovsk-Kamchatskiy in cooperation with the Medical Parasitology and Tropical Medicine Institute imeni Ye. I. Martsinovskiy of the USSR Ministry of Health and the All-Union Scientific Center for Surgery [VNTsKh] of the USSR Academy of Medical Sciences. Serological screenings of the population with enzyme immunoassay systems developed in the Medical Parasitology and Tropical Medicine Institute imeni Ye. I. Martsinovskiy are conducted at the centers. But further thorough clinical screening of those found to be seropositive and surgical treatment are being held back by the lack of ultrasound diagnostic equipment and the inadequate training of surgeons, with fewer than 100 such operations performed in Baku in a year.

Schools of advanced parasitology practice that have been created in the MSSR, UkSSR, and RSFSR have been extremely helpful in organizing and conducting prophylactic measures. But this form of experience exchange has yet to be properly developed in other union republics.

The solution of the scientific and practical problems associated with the prevention and control of parasitic diseases needs further amplification of the work done by the parasitology sections of the All-Union Scientific

Society of Microbiologists, Epidemiologists, and Parasitologists imeni I. I. Mechnikov and the "Parasitic and Tropical Diseases" problem commission of the USSR Academy of Medical Sciences.

Attention needs to be focused on the development and implementation of a comprehensive program of scientific research in the field of medical parasitology, to include the solution of problems of practical health care, the creation of regional interdepartmental programs for preventing and controlling parasitic diseases, and the development of scientific bases for assessing the parasitological situation in process of conducting medical and biological reconnaissance of areas involving the economic development of sparsely populated regions of the country.

A reexamination of programs and training plans is needed, as is the formation of social demands for the conduct of scientific studies.

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Characteristics of Salmonellosis in Kazakhstan

907C0272A Alma-Ata ZDRAVOOKHRANENIYE
KAZAKHSTANA in Russian No 8, Aug 89 pp 17-21

[Article by B. V. Rayushkin, V. P. Savitskiy and A. T. Kenzhebayeva, Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases, Alma-Ata]

[Abstract] The increasing importance of salmonellosis in human pathology in the USSR and in Kazakhstan was attributed to urbanization, industrialization of animal husbandry and poultry farming, centralization of food production and extension of the public catering network. The dynamics of morbidity from 1974-1981 were discussed briefly. Diagnostic techniques were described. Analysis of morbidity from salmonellosis and other acute intestinal diseases in different parts of the country showed that the relationship between them ranged from 1:2.5-1:42.1, thereby calling for great improvement in diagnosing salmonellosis. Different types of salmonellosis change into anthroponotic intestinal infections causing outbreaks and high morbidity. Control of salmonellosis requires cooperative efforts of health services and veterinary services aimed at development and introduction into practice of a complex medical and veterinary study of the patterns of epizootic and epidemic processes as a function of natural and geographic conditions and economic activity of the people; improvement of the continuing sanitation and hygiene and veterinary supervision of epidemically significant factors which spread the infection; provision for the all-around detection, accounting and maximum identification of acute infectious diseases in order to diagnose salmonella effectively; and study of the ecology of the pathogen with specific exposure of the significance of specific serovars in epidemic and epizootic processes. Figure 1; references 11 (Russian).

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Epidemiological Characteristics of Legionella pneumophila Infection

907C0272B Alma-Ata ZDRAVOOKHRANENIYE
KAZAKHSTANA in Russian No 8, Aug 89 pp 29-31

[Article by M. S. Bayzhomartov, U. Kh. Khayrov, G. U. Dyuskaliyeva et al., Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases, Alma-Ata; Semipalatinsk Regional Sanitation- Epidemiological Station]

[Abstract] A study of the immunostructure of the population of certain regions of Kazakhstan in relation to *Legionella pneumophila* infection and the pathogen's etiological role in infectious pathology in children involved the study of 2,866 blood samples taken from healthy adults from various regions. Etiological diagnosis involved a study of 136 blood samples taken from children hospitalized in Semipalatinsk. Group 1 (91 patients) included persons with a diagnosis of acute pneumonia; group 2 (17 patients) included individuals with diagnosis of enterocolitis, toxicosis with exsiccosis I-II degree or acute renal insufficiency. Studies of 13 samples of drinking water and industrial waste water and 28 smears from drinking water containers and showers in departments of the hospital showed one source of infection to be drinking water containers with sediments not being cleaned out. Manifestation of *Legionella pneumophila* infection in the children evidently came from contact with contaminated water. This pathogen is spread widely in fresh water reservoirs, in closed water systems, showers, baths and basins. Sporadic cases arise because the pathogen multiplies in metal containers used to store drinking water for hospitalized young children. The seroepidemic study showed a general presence of the pathogen in the Kazakhstan population. Alma-Ata Oblast has an intense concentration of the pathogen (25 percent), with other regions of the republic having 1.9-19 percent. In Semipalatinsk, it has etiological significance in 10.9 percent of cases of acute pneumonias and in 23.5 percent of cases of enterocolitis with development of toxicosis and acute renal insufficiency in young children. References 2 (Russian).

UDC 616.36-002-022-056.76

Clinical-Epidemiological Aspects of Viral Hepatitis B in Family Foci

907C0265A Tashkent MEDITSINSKIY ZHURNAL
UZBEKISTANA in Russian No 6, Jun 89 (Manuscript received 3 Nov 87) pp 17-19

[Article by Sh. Kh. Khodzhaev, Ye. A. Gent, and R. A. Rakhimov, Uzbek Affiliate, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences]

[Abstract] Hepatitis B infection can occur under natural conditions by living with a source of infection. Clinical epidemiological observations were performed on 30 family foci of patients who were HBs-positive for hepatitis B. A laboratory study was also performed of 109 family members (59 children, 50 adults) in Tashkent, a hyperendemic area for hepatitis B. Of the 109 family members during the clinical and observation, 51 were found to be infected: 10 had the jaundice form, 32 had the nonjaundice form, and 8 were found to be HBs carriers. The study therefore revealed patients with both jaundice and atypical forms of the disease. References 4 (Russian).

UDC 577.214.622:579.842.11:579.871.1

**Development of Vector-Host System For
Corynebacteria. Cloning and Study of Expression
of Genes Coding For Homoserine Dehydrogenase
and Homoserine Kinase in Corynebacterium Cells**

907C0809A Moscow GENETIKA in Russian Vol 26
No 4, Apr 90 pp 648-656

[Article by A. L. Okorokov, N. O. Bukanov, O. Yu. Beskrovnaya et al.; All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] Construction of a new shuttle vector for glutamate-producing corynebacteria was based on the cryptic plasmid pBO1 (4.4 kb) located in *Brevibacterium* sp. and plasmid pACYC184 (4.0 kb) from *Escherichia coli* produced composite plasmid pKA1. This plasmid could produce resistance to chloramphenicol in cells to and could be replicated in *E. coli* and some kinds of corynebacteria (*Corynebacterium glutamicum*, *Br. lactofermentum*, *Br. flavum*). The plasmid pKA1 and its deletion derivatives pKA11, pKA12, having unique restriction sites (HindIII, SalGI, SphI) were used to clone genes of biosynthesis of corynebacteria threonine. Recombinant plasmids were introduced into corynebacteria protoplasts by polyethylglycol-mediated transformation of plasmid DNAs. The presence of plasmids containing the *Br. flavum* thrA2* gene in strain *C. glutamicum* (thrB) produced a 10-fold increase of homoserine dehydrogenase activity in comparison with the wild type strain and an increase in homoserine production. Figure 1; references 15: 2 Russian; 13 Western.

UDC 579.252.5

**New Plasmids of Herbicide
2,4-dichlorophenoxyacetic Acid Biodegradation**

907C0809B Moscow GENETIKA in Russian Vol 26
No 4, Apr 90 pp 770-772

[N. R. Ausmees and A. L. Kheynaru; Tartu State University; Estonian Republican Biocenter For Genetic and Cellular Engineering at ESSR Academy of Sciences, Tartu]

[Abstract] Soil bacteria belonging to different species were isolated from different regions of the ESSR. Cultures of EST4001, EST4002 and EST4003, differing greatly in cultural properties, were selected for further study. The strains from different species contained identical 2,4-D biodegradative plasmids with molecular weight of 78 kb. Transconjugants of strain *Pseudomonas putida* PaW340 2,4-D of plasmid pEST4001 underwent deletion, forming 2,4-D plasmid pEST4011 with molecular weight 70 kb. The molecular structure of these plasmids differed significantly from 2,4-D plasmids pJP4 and pRC10 described previously. The study confirmed that the same type of plasmids of 2,4-D biodegradation are widely distributed among soil bacteria of the same region. Figure 1; references 8 (Western).

UDC 575:581.17:581.154:635.21

**Potato Hybrids With Cytoplasm of Different
Species of Nightshade Family**

907C0116B Moscow DOKLADY AKADEMII NAUK
SSSR in Russian Vol 308 No 3, Sep 89 pp 741-743

[Article by V. A. Sidorov, V. M. Samoylov, A. M. Samoylov et al., Department of Cell Biology and Engineering, Institute of Botany imeni N. G. Kholodnyi, UkSSR Academy of Sciences, Kiev]

[Abstract] The work reported here studied the compatibility of the *S. tuberosum* genome and cytoplasm of different tuberiferous and non-tuberiferous representatives of the nightshade family and production of new alloplastic forms of potato that preserve typical varietal heterozygosity of the genome and possess a new set of cytoplasmic genetic determinants. Various transgenic forms of potato with new sets of nuclear and cytoplasmic determinants were isolated. The possibility of production of asymmetric hybrids was demonstrated in all combinations of fusions studied. Their practical value must be assessed by a selector. Special interest, from a practical point of view, was expressed in hybrids, the isolation of which appeared to be possible predominantly in phylogenetically closely related combinations of species. Identification of phenotypically normal potato plants with cytoplasm of a wild non-tuberiferous species, *S. rickii*, indicated compatibility of the genome of the cultivated potato and cytoplasm of the wild species. The data obtained indicated the possibility of use as a cytoplasm donor in selection work of both tuberiferous species and the non-tuberiferous species *S. rickii*. References 6 (Western).

Engineering and Psychological Problems of Planning Operator Activity

907C0393A Moscow *PSIKHOLOGICHESKIY ZHURNAL* in Russian Vol 10 No 5, Sep-Oct 89 pp 66-74

[Article by V. V. Pavlyuchenko, V. M. Lvov, and V. V. Spasennikov]

[Abstract] The engineering and psychological aspects associated with the direct organization of the operator work area are examined. The current approaches to planning operator activity in man-machine systems are analyzed. Direct, feedback, and inverse problems are solved using models of individual and group activity. The main features and specifics of constructing the regression and structural models of synthesis that are used in solving the three types of problems are examined. The two basic approaches to simulating planning activity—heuristic and semiotic—are defined and discussed. The heuristic model is based on the hypothesis of the functional similarity of perception, thinking, and behavior and uses hierarchal structures and branching processes and makes correctly simulating the aspects of planning activity possible. The semiotic approach generates variations of a solution based on a model of the problem situation. Synthesis models are still being developed. There are three basic approaches to the development of such models: the use of information theory, the use of queuing theory, and the use of statistical micro-structural models that enable equipment parameters and man-machine interaction to be matched with operator psychophysiological capacities. The creation of mathematical methods and various combined models that play through possible alternatives and use them as planning resources is an important part of the planning process. The structure of the problems of researching operator activity with respect to the stages of development and

use of man-machine systems is examined and includes the early stages of planning, when there is very little data on the activity of the system being planned. In the stage of the man-machine system equipment planning, workplaces are constructed and a system for selecting and training operators is developed. In the stage of manufacturing and testing the man-machine system, the organization and equipment of activity are assessed, along with the methods and resources for selecting and training operators. References 36: 32 Russian, 4 Western.

UDC

629.78+613.693]:[612.821+612.825.8+612.745.6].519.86

Combined Approach to Fuzzy-Set Modeling of Operator's Functional State

907C0238D Moscow *KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA* in Russian Vol 23 No 4 Jul-Aug 89 (Manuscript received 20 Jul 88) pp 29-33

[Article by S. V. Astanin]

[Abstract] A model of the functional state of the operator of modern high-speed, automated equipment is suggested, based on the concept of functional subsystems of the body, extended to various levels of structural organization of the man-machine system. Analysis of information flows in the system is used to distinguish elements of the internal and external environment within which the human operator functions. The hierarchical model is suitable for evaluation and prediction of the functioning of elements containing characteristics of the task performed by the operator, the mental functions of the human and the object or information system which the operator monitors or controls. Figures 3; References 3 (Russian).

Erythrocyte Regulation of Immune Response

907C0727A Moscow IZVESTIYA in Russian 16 Jun 90
Morning Edition p 3

[Article by I. Novodvorskiy: "From Erythrocytes to Space," published under the rubric "Modern-Day Discoveries"]

[Excerpt] On 14 June 1990, the State Committee for Inventions and Discoveries registered two discoveries: in medicine and in elementary particle physics.

For years medical science has assigned to red blood cells—erythrocytes—an important but limited role: providing the body with oxygen. V. Kozlov, doctor of medical science, I. Tsyrova, candidate of medical sciences, and V. Cheglyakova, candidate of medical sciences (members of the staff of the Institute of Clinical Immunology, Siberian Department, Academy of Medical Sciences of the USSR), discovered that the role of red blood cells is much wider. They are capable of regulating the immune response of the body. For example, they control the division of lymphocytes responsible for immunity to viruses, bacteria and tumors. Other erythrocytes are responsible for production of antibodies. These phenomena have been observed in various diseases as well as in healthy individuals. New fundamental knowledge has made it possible to develop new treatments for diseases of the lungs and other organs with new drugs protected by author's certificates for original inventions.

UDC 615.275.4.015.44.07

Mutagenicity Testing of Novel Immunomodulator

907C0769D Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 3, Mar 90 (manuscript received 14 Feb 89) pp 56-61

[Article by V. M. Volgareva, S. Ya. Savranskaya, Yu. D. Tolcheyev and O. R. Anpilogova, Scientific Research Institute of Vaccines and Sera imeni I. I. Mechnikov, USSR Academy of Medical Sciences, Moscow]

[Abstract] A comprehensive battery of tests was used to conduct mutagenicity testing of STP, an immunostimulant prepared from cultures of Streptococcus sp. TOM-1606 cultures. STP is a peptide that stimulates the humoral immune response and markedly enhances phagocytic activity of macrophages, yet lacks toxicity in doses exceeding 10,000-fold doses required for immune effects. In vivo studies, employing i.p. administration to mice in doses ranging from 6.7×10^2 to 6.7×10^4 µg/kg, showed that STP did not increase the number of Howell-Jolly bodies (micronuclei) in bone marrow erythrocytes, i.e., that it was nonmutagenic in doses 1000-fold greater than immunostimulant doses. In addition, the results were also negative in Ames' tests performed with Salmonella typhimurium TA-98 and TA-100. Figures 1; tables 2; references 12: 9 Russian, 3 Western.

UDC

16.155.02-007.12-085.849.1+615.277.3]+616.419-089.843+615.373

Modeling of 'Universal' Bone Marrow By Monoclonal Antibodies

907C0203E Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 108 No 7, Jul 89 (Manuscript received
11 Jul 8) pp 83-85

[Article by K. L. Chimishkyan, A. Yu. Baryshnikov, G. Sh. Ovumyan, V. N. Kostyrykina, I. A. Karnov, A. M. Buntsevich, Ye. G. Slavina, G. A. Udalo, Z. G. Kadagidze, All-Union Oncology Science Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] The use of monoclonal antibodies has been helpful in preventing reaction of bone-marrow transplantates against the host, but the problem has arisen of selecting the optimal monoclonal antibody and method of donor bone-marrow treatment. This work models the prevention of development of transplant disease using IKO-10 monoclonal antibody directed against Thy-1-antigen. The studies showed that two-time treatment of allogenic bone marrow with the monoclonal antibody completely eliminated the T-cells, preventing development of the reaction of the transplantate against the host. Complete protection of irradiated mice was achieved only by two-time treatment of the bone marrow with the monoclonal antibody and complement. Thymus atrophy and absence of T-cells in the peripheral blood was observed in the experimental mice. Figure 1; References 7: 3 Russian, 4 Western.

UDC 616.98:578.833.26]-092:612.017.1]-092.9

Immunization of Rabbits by Lassa Fever

907C0662D Moscow VOPROSY VIRUSOLOGII
in Russian Vol 35 No 1, Jan-Feb 90 pp 59-61

[Article by S. V. Orlova, A. T. Godneva, G. M. Ignatyev and S. I. Bystrova; Belorussian Scientific Research Institute of Epidemiology and Microbiology, BSSR Ministry of Health, Minsk]

[Abstract] A study of indicators of humoral and cellular immunity after immunization of rabbits, which are not susceptible to Lassa virus, by infectious and inactivated Lassa virus antigens used Sierra-Leone and Gosiah strains of Lassa virus and 3-3,5 kg Chinchilla rabbits. The infectious virus caused synthesis of specific antibodies in the rabbits. The antibodies level was directly proportional to the inoculation dose and the time of immunization. Both replicating and inactivated antigens caused a rather high concentration of antibodies in the rabbits' blood serum and the tested regime of inactivation of the virus by γ-irradiation preserved the immunogenic properties of the Lassa virus antigen. The specificity of blastotransformation of lymphocytes of the

immunized rabbits after repeated encounters with Lassa virus in vitro was demonstrated. This state lasted after 30 days after the end of immunization. Leukocyte blastogenesis tests in a skin sample and delayed type hypersensitivity tests confirmed development of sensitization

to inactivated Lassa virus in immune rabbits. The study confirmed formation of both humoral and cellular forms of immunoreaction as a result of multiple immunization by inactivated virus. References 13: 7 Russian; 6 Western.

UDC 615.849.19.015.4:616.153.96].07

Effect of Low-intensity Laser Radiation on State of Blood Proteins

907C0280D Moscow *BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY*
in Russian Vol 108 No 8, Aug 89 pp 188-190

[Article by V. M. Genkin, V. F. Novikov, L. V. Paramonov and B. I. Elkina, Institute of Applied Physics, USSR Academy of Sciences; Gorky Medical Institute imeni S. M. Kirov]

[Abstract] Study of the effect of low-intensity laser radiation on the state of blood proteins involved the use of whole blood, plasma and thrombocytic mass. The effect was assessed by the use of fluorescent probes including 1,8-anilinonaphthalenesulfonate (ANS) and 4-(n-dimethylaminostyrene)-1-methylpyridine (DSM).

ANS was excited by fluorescence at 270 nm wavelength and recorded in a wide range of wavelengths exceeding 360 nm. The wavelengths for DSM were 470 nm and 530 nm. The level of effect of irradiation depended upon the time which passed after irradiation for some blood samples. After 24 hours of incubation the effect of irradiation dropped greatly, reaching 0 in some cases. The degree of binding of the fluorescent probes 1,8 ANS by blood proteins and cells was used as the index of response to irradiation. Light radiation with a 632.8 nm wavelength evidently changed the charge of the blood proteins. The nature of change of fluorescence of the oppositely charged probes indicated that helium-neon laser radiation changes the charge of blood proteins somewhat, with the negative charge being decreased in most cases. The amount of the effect depended upon individual properties of the material studied, radiation dose and the incubation time after irradiation. References 12: 10 Russian; 2 Western.

UDC 616.831-007.271-008.6-085.835.12

Effect of Hyperbaric Oxygenation on Acute Compression-Dislocation Syndrome in Experiment

907C0478A Moscow *ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S.S. KORSAKOVA* in Russian Vol 89 No 12, Dec 89 (manuscript received 29 Apr 87) pp 3-7

[Article by Yu. V. Isakov and B. M. Livshits, Department of Hyperbaric Oxygenation, Scientific Research Institute of Emergency Medicine imeni N. V. Sklifosovskiy]

[Abstract] Acute compression-dislocation syndrome that develops as a result of an injury, vascular pathology, or brain tumor frequently determines the outcome of the disease. The fact that surgery to eliminate the cause of the compression of the brain stem does not always have a positive outcome prompted the researchers here to seek new methods for treating acute compression-dislocation syndrome in the post-operative period. The effect of hyperbaric oxygenation on acute compression-dislocation syndrome was studied. Fifty-two chinchilla rabbits were used in the experiment. After the animals had some time to adapt to the trauma associated with acute compression-dislocation syndrome, their clinical condition was assessed, and the compression was increased every 20-30 minutes for 1-2 hours until serious acute compression-dislocation syndrome developed. The animals were observed for 7-8 hours and then a catheter was inserted to release some of the fluid that had been used to induce compression. The experimental group of animals was placed in a pressure chamber in which hyperbaric oxygenation treatments were given, with an average of seven per rabbit. The effect of hyperbaric oxygenation was noted from the very beginning of the sessions. Half of the animals in the experimental group lived to the end of the experiment, as opposed to only two of the 26 in the control group. Almost all of the control animals exhibited behavioral disorders, while such problems had generally passed by the sixth day in the animals that received hyperbaric oxygenation. Hyperbaric oxygenation caused some reduction of edema in all of the brain structures studied. The positive effect of hyperbaric oxygenation is tied to improving oxygenation of the brain tissue, reducing hypoxia and edema of the brain, and decreasing intracranial pressure. References 16: 8 Russian, 8 Western.

UDC 616.5-001.4-092:612.273.2]-085.357:577.175.322]

Influence of Somatotropin on Skin Wound Healing in Hypoxia

907C0238I Moscow *KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA* in Russian Vol 23 No 4 Jul-Aug 89 (Manuscript received 19 Jun 87) pp 69-73

[Article by G. V. Khomullo, V. I. Lotova, A. N. Chernyayev]

[Abstract] Previous studies have indicated that hypoxic hypoxia inhibits skin wound healing processes. This article studies the possibility of normalization of post-traumatic skin regeneration under hypoxic conditions by administration of somatotropin, which has been shown to increase resistance to hypoxia. Somatotropin is found to have a clear normalizing influence on wound healing under hypoxic conditions as a result of a number of factors. Somatotropin increases the intensity of tissue respiration by increasing the catabolism of fats. Oxidative phosphorylation is increased by increasing the synthesis of mitochondrial protein. The anabolic phase of protein metabolism is increased; the transport of amino acids is accelerated; their inclusion in the nuclei, mitochondrial and microsomes is increased by increasing the permeability of cell membranes; and the synthesis of RNA in the nucleus is stimulated. Somatotropin also decreases the duration of individual phases of the mitotic cycle, probably as a result of an increase in the synchronism of DNA synthesis in the cell genome. Figures 1; References 18: 12 Russian, 6 Western.

UDC 616-001.4-022.7-092-085.272.014.425

Experimental Antioxidant Therapy of Purulent Wounds

907C0203B Moscow *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY* in Russian Vol 108 No 7, Jul 89 (Manuscript received 22 Nov 88) pp 35-37

[Article by A. Yu. Agayev, A. V. Nikolayev, B. Kh. Abasov, L. A. Mamedov, V. V. Zhakharov, E. A. Bashirov, G. S. Bagirov, Azerbaijan Medical Institute imeni N. N. Narimanov, Baku; First Moscow Medical Institute imeni I. M. Sechenov]

[Abstract] Ionol, nialamid and urotropin are used in initial stages of purulent inflammation to stimulate amine metabolism, normalize pH and suppress the growth of microflora, significantly improving the results

of treatment of purulent wounds. Experiments were performed on 22 chinchilla rabbits with abscesses created experimentally. Immediately after opening the abscess, nialamid was administered at 2 mg/kg per os; the wound was surgically treated and washed with a 10 percent aqueous solution of urotropin, and the dressing placed over the wound contained a 2 percent alcohol solution of ionol. Treatment was continued twice per day for seven days. Granulation tissue developed in half the time, and the complete time of wound healing was reduced by 40 percent by this treatment. References 12: 11 Russian, 1 Western.

UDC 615.919:598.12]:577.152.34].012

Isolation and Characteristics of Protein C Activator From the Venom of the Copperhead

907C0203C Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 108 No 7, Jul 89 (Manuscript received
20 Nov 88) pp 57-59

[Article by A. N. Storozhilova, M. D. Smirnov, A. B. Dobrovolskiy, S. V. Kudryavtsev, V. N. Titov, Institute of Clinical Cardiology imeni A. L. Myasnikov, All-Union Cardiology Science Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] Protein C is a vitamin-K-dependent blood-plasma protein regulating the blood-coagulation cascade by the negative-feedback principle. The venom of two North American snakes of the Agkistrodon genus contains a protease which selectively and rapidly activates plasma protein C without influencing subsequent functional activity. The purpose of this article is to study the venom of snakes of the genus Agkistrodon inhabiting the USSR for their content of the protein C activators and to develop a simple method of producing an activator allowing determination of protein C in the plasma by a functional method. Chromatic focusing and gel filtration are used to obtain a preparation which can be used to determine protein C in the plasma. Of four species studied (A. contortrix contortrix, A. halys caraganus, A.

saxatilis, and A. blomhoffi ussuriensis), only A. contortrix contortrix produced activation of protein C. The isolated enzyme does not clot human fibrinogen, and it generates protein C activity when mixed with normal plasma. Figures 3; References 14 (Western).

Case of Rapid Recovery From Brucellosis After Use of Xenobiosorption

907C0272C Alma-Ata ZDRAVOOKHRANENIYE
KAZAKHSTANA in Russian No 8, Aug 89 pp 64-65

[Article by L. Ye. Tsirelson, T. A. Popov and S. M. Gabidullina, Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases; Scientific Research Institute of Clinical and Experimental Surgery imeni A. N. Syzganov; KaSSR Clinical Hospital IOV, Alma-Ata]

[Abstract] The increase of the epidemiological danger of goat and sheep brucellosis has been complicated by the evolution of its clinical picture, with predominance of manifest forms of the disease and transformation of it into the chronic form in 40-60 percent of the cases, with appearance of cases of acute brucellosis with a protracted septic course unresponsive to traditional treatment. In view of the ineffectiveness of conventional treatment, one patient who had been treated unsuccessfully for 34 days for acute brucellosis was treated by a method of extracorporeal hemosorption. A spleen shunt, used at the Scientific Research Institute of Clinical and Experimental Surgery imeni A. N. Syzganov to treat purulent-septic states in patients with surgical and other pathologies was employed, and the treatment was quite effective. The Soviet and foreign literature contains no information about the use of this procedure to treat brucellosis. Patient K, age 32, entered the hospital in grave condition with clear signs of intoxication; he had difficulty walking, because of joint pains. After the shunt was devised, perfusion was carried out at the rate of 45 ml/min. The xenobiosorption session lasted 52 minutes, with perfusion of 2,340 ml of blood. The next day the patient's temperature dropped to 37.5°C, joint pain diminished, and the patient became more active. The patient was released in satisfactory condition and remained well after checkups at 1, 3, 5, 6 and 12 months. Clinical testing of the procedure is continuing.

UDC 616.98:579.852.13]-07:[616.833+616.834.2]-091

Morphological Changes in Cranial Nerves and Spinal Ganglia and Roots in Botulism*907C0396A Moscow ARKHIV PATOLOGII in Russian
Vol 51 No 10, Oct 89 (manuscript received 1 Nov 88)
pp 45-50*

[Article by Yu. G. Parkhomenko, M. V. Kozlov, Laboratory of Infectious Pathology, Scientific Research Institute of Human Morphology, USSR Academy of Medical Sciences]

[Abstract] Fatal outcomes in botulism are most frequently due to respiratory paralysis and pneumonia. The twelve pairs of cranial nerves, spinal ganglia, and roots were morphologically studied in four people who had died from botulism. Dystrophic changes with severe edema and formation of microcavities were found in most of the nerves and spinal ganglia. Homogenization of the nerve trunks and fragmentation and decay of axons were noted in most of the cranial nerves. Vascular alterations were characterized by hemolysis of the erythrocytes in the paretically dilated vessels, diapedesic internal hemorrhage, fibrin thrombi, sludge syndrome, and focal dystrophic changes in the vessel walls. The infiltrative-proliferative processes were characterized by slightly expressed lymphoid cellular infiltration of the trunks of individual cranial nerves and spinal ganglia. The studies revealed varying degrees of pathologic changes. It is believed that various types of hypoxia play a major role in the pathogenesis of botulism, and even artificial respiratory devices will not stop the degenerative processes in the large motor neurons in the anterior horns of the spinal cord. Disturbances in microcirculation may be the reason for problems in the histohematic barriers and direct harmful action of botulism in the neurons and axons. A number of researchers believe that botulism binds to the presynaptic endings, as a result of which a block develops between the transmission of the impulse from the nerve to the muscle. It is likely that structural changes in the peripheral nerve conductors may also be due to functional abnormalities. Figures 2, references 10: 8 Russian, 2 Western.

UDC 579.841.11.082.56

Preservation of Surfactant-Degrading Pseudomonads*907C0643D Moscow MIKROBIOLOGIYA in Russian
Vol 59 No 1, Jan-Feb 90 (manuscript received
14 Mar 88) pp 156-162*

[Article by M. N. Rotmistrov (dec.), S. S. Stavskaya, L. A. Taranova, T. Yu. Grigoryeva, G. A. Trenina, M. V. Klyucheva (dec.) and T. V. Yemtseva, Institute of Colloid Chemistry and Water Chemistry imeni A. V. Dumanskiy, Ukrainian SSR Academy of Sciences, Kiev; All-Union Scientific Research Institute of Genetics, Moscow]

[Abstract] Trials were conducted with surfactant-degrading pseudomonads to determine conditions favoring optimum preservation of the bacteria, in view of their putative importance in the treatment of surfactant-polluted waters. Comparison of survival rates with degradation of sulfoethoxylate, sulfonate, cyclimide, and amidobetaine demonstrated that *Pseudonas putida*, *Ps. rathonis*, *Ps. desmolytica*, and *Ps. stutzeri* were best preserved as lyophilized cultures at 12°C for 1 to 2 years. Optimum results were obtained with cultures lyophilized in the stationary phase of growth. Although the survival rate was higher with cultures maintained at -70°C in 20 percent glycerol, lyophilization in general ensured higher levels of surfactant-degrading activity. Tables 6; references 12: 9 Russian, 3 Western.

UDC 579.852.11.025:550.72

Microbial Degradation of Beryllium-Containing Silicates*907C0643A Moscow MIKROBIOLOGIYA in Russian
Vol 59 No 1, Jan-Feb 90 (manuscript received
23 Mar 88) pp 63-69*

[Article by Ye. O. Melnikova, Z. A. Avakyan, G. I. Karavayko, and V. S. Krutsko, Institute of Microbiology, USSR Academy of Sciences, Moscow; All-Union Scientific Research Institute of Chemical Technology, Moscow]

[Abstract] Leaching studies were conducted with a number of beryllium-containing silicate minerals to assess the efficacy of *Bacillus mucilaginosus* and *Thiobacillus ferrooxidans* under a variety of conditions. The results demonstrated that growing cultures of *B. mucilaginosus* enhanced the rate of leaching of beryllium, aluminum, and silicon 5- to 20-fold from beryl, chrysoberyl, and margarite. After leaching, the concentrations of beryllium ions reached 100 to 1000 mg per liter, with the minerals showing the following ranking in susceptibility to biodegradation: beryl > margarite > chrysoberyl. *T. ferrooxidans*, grown on Lethen's medium with Fe²⁺, leached zinc, manganese, beryllium, and silicon from genthelvite at a rate exceeding control leaching 235-, 20-, 22-, and 20-fold, respectively. In addition, concentrations of beryllium ions as high as 49 g per liter were found to be nontoxic to *T. ferrooxidans*. Tables 6; references 11 (Russian).

UDC 579.852.11.017.7:550.72

Role of *Bacillus Mucilaginosus* Polysaccharides in Degradation of Silicates*907C0643B Moscow MIKROBIOLOGIYA in Russian
Vol 59 No 1, Jan-Feb 90 (manuscript received
7 May 88) pp 70-78*

[Article by I. M. Malinovskaya, L. V. Kosenko, S. K. Votseko, and V. S. Podgorskiy, Institute of Microbiology and Virology imeni D. K. Zabolotnyy, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Exopolysaccharides of *Bacillus mucilaginosus* S-3 were shown to be a key factor in leaching silicon ions from clay shale and quartz sand, acting in conjunction with acidic organic metabolites secreted by the bacterium. The key mechanism involved adsorption of the organic acids on the exopolysaccharide, increasing the capacity of the polysaccharide for SiO_3^{2-} . Adsorption of SiO_3^{2-} leads to a shift in equilibrium which favors additional leaching from the silicates. Saturation of the binding sites on the exopolysaccharide for SiO_3^{2-} terminates further leaching. Tables 5; references 20: 11 Russian, 9 Western.

UDC 579.841.11.017.7

Oxidation of Iron and Manganese by Arsenite-Oxidizing Bacteria

907C0643C Moscow MIKROBIOLOGIYA in Russian
Vol 59 No 1, Jan-Feb 90 (manuscript received 7 Dec 86)
pp 85-89

[Article by S. A. Abdrashitova, G. G. Abdullina, B. N. Mynbayeva, and A. N. Ilyaletdinov, Institute of Microbiology and Virology, Kazakh SSR Academy of Sciences, Alma-Ata]

[Abstract] Metabolic investigations were undertaken on *Pseudomonas putida* 18 and *Alcaligenes eutrophus* 280 to determine the mechanisms underlying their ability to oxidize iron, manganese, and arsenite. The results confirmed previous studies with arsenite that oxidation of iron, manganese, and arsenite was coupled with lipid peroxidation. Iron, manganese, and arsenite initiated peroxidation of unsaturated fatty acids. Oxidation of the metal ions followed from their reaction with hydrogen peroxide formed in the peroxidation step. Maximum levels of Fe^{2+} reached 36 mg/liter in the case of *Ps. putida* 18 and 28 mg/liter in the case of *A. eutrophus* 280, while the corresponding maximum values for Mn^{2+} were on the order of 2.8 and 2.0 mg/liter for the two cultures. Figures 3; tables 1; references 5 (Russian).

UDC 579.841.11.017.7

Secondary Metabolism of *Pseudomonas putida* Transconjugants Degrading Chloro- and Methylaromatics

907C0643E Moscow MIKROBIOLOGIYA in Russian
Vol 59 No 1, Jan-Feb 90 (manuscript received 7 Apr 88)
pp 163-165

[Article by O. V. Maltseva and L. A. Golovleva, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino]

[Abstract] Transconjugate *Pseudomonas putida* 37cc was constructed by transferring a plasmid from *Ps. putida* 87 (capable of growing on 3-chlorobenzoic acid)

into *Ps. putida* R-1 (utilizing diphenyl, α -methylstyrene, and toluene). *Ps. putida* 37cc was capable of growth on media containing chloro- and methylaromatic compounds due to inducible pyro- and metapyrocatechases. The metapyrocatechase of *Ps. putida* 37cc was identical to that of the parental *Ps. putida* R-1, while the enzyme involved in metabolism of chloropyrocatechols was analogous to that of *Ps. putida* 87. In addition, growth on benzoate led to induction of an additional pyrocatechase in *Ps. putida* 37cc with low activity for chloropyrocatechols. Tables 2; references 5: 2 Russian, 3 Western.

UDC 616.98:579.842.23:579.253]-076.5

Cytopathogenic Properties of *Yersinia Pestis* Strains in L-41 Cell Culture

907C0823 Moscow LABORATORNOYE DELO
in Russian No 5, May 90 pp 64-66

[Article by Yu. L. Kiselev and R. D. Aspetov; Central-Asiatic Scientific Research Anti-plague Institute, Alma-Ata]

[Abstract] The study presented results of a test of cytopathogenic action of *Y. pestis* strains in a L-41 cell culture (cloned variant of continuous cell line J-96, obtained from human bone marrow of a leukemia patient). Cells were infected by introduction into the microplate loop of about 0.1 ml of medium 199 containing from 10^1 to 10^7 microbial cells and incubated. Uninfected cells and the growth of strains in medium 199 served as a control. Results of the experiment were calculated after 12, 24, 48 and 72 hours with use of a microscope. All strains of *Y. pestis* studied showed cytopathogenic action in L-41 cell cultures. The degree of pronouncement of cytopathogenic action correlated directly with indicators of virulence of the strains for white mice and with their ability to multiply in the cellular system and to demonstrate cytopathogenic effect. The sign of cytopathogenic action in L-41 cell culture was an important indicator of the biological activity of the plague microbe and may be used as one of the criteria of assessment of the degree of virulence of strains. Figure 1; references 3: 2 Russian; 1 Western.

UDC 579.887.9:579.252.5]-08

Plasmid Transformation of *Legionella*

907C0769B Moscow ZHURNAL MIKROBIOLOGII,
EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 3, Mar 90 (manuscript received 5 Jan 89) pp 20-23

[Article by B. I. Makarusha, Ye. Yu. Feoktistova, I. S. Tartakovskaya and S. V. Prozorovskiy, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] Genetic studies were conducted with *Legionella pneumophila* and *L. bozemanii* which

showed that the various strains were transformed by plasmids pSC101, RSF1010-pBR322, pUC19, and pUC4K. With the CaCl_2 method efficiencies of 5.8×10^{-7} to 5.2×10^{-6} were obtained. Electrophoretic studies revealed that in some of the transformed cells plasmids were detected with MW similar to that of the transforming plasmid. In addition, pSC101 and RSF1010 were found to be relative stable, with 75 percent of the clones losing the pBR322 component in the latter case. pUC19 and pUC4K were lost from 50-80 percent of the clones after 3 months. The present study represents the first successful transformation of *Legionella* by plasmids. Tables 1; references 17: 3 Russian, 14 Western.

UDC 615.919:579.843.1:579.253].07

Production of Exotoxin by Wild Strains of *Vibrio cholerae*

907C0769A Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 3, Mar 90 (manuscript received 15 May 89) pp 6-10

[Article by N. I. Smirnov, L. F. Livanova and G. A. Yeroshenko, "Mikrob" All-Union Scientific Research Antiplague Institute]

[Abstract] Assays studies for exotoxin production were conducted on 27 strains of nonhemolytic *Vibrio cholerae* isolated from patients, encompassing classical and El Tor biovars. The study led to identification of 4 strains as producers: *Vibrio cholerae* *cholerae* Dacca 35, *Vibrio cholerae* *cholerae* Dacca 3, *Vibrio cholerae* *cholerae* B1307, *Vibrio cholerae* *cholerae* J89. One Ogawa serovar, Dacca 35 (tox^+Op^-), was particularly productive (10-13 $\mu\text{g/ml}$) and differed in colonial morphology from nontoxigenic Dacca 35 strain (tox^+Op^+ (0.3 $\mu\text{g/ml}$)). Hybridization studies demonstrated that both (tox^+Op^+ and (tox^+Op^- Dacca 35 variants possessed two copies of the *vctAB* gene on the chromosome, which is responsible for cholera toxin production. The fact that reversion from tox^+ to tox^- was always accompanied by reversion from Op^- to Op^+ suggests that an identical element controls cholera toxin structural genes and genes encoding surface proteins. References 14: 4 Russian, 10 Western.

UDC 582.285.2:58.035+58.055

Effect of Environmental Factors on Viability of Uredospores in *Puccinia striiformis* West. f. sp. *Tritici*

907C0383C Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 23 No 5, Sep-Oct 89 (manuscript received 21 Mar 88) pp 445-449

[Article by R. K. Belyavskaya and V. T. Goncharov, North Caucasus Scientific Research Institute of Phytopathology, Krasnodar]

[Abstract] Yellow rust pathogens can be transported across great distances. An attempt was made to determine which environmental factors are effective in lowering the infectivity of *P. striiformis* uredospores. Limited literature data showed that the factors affecting the viability of those pathogens during air movement are sunlight, air temperature and humidity. To verify that, the researchers studied freshly harvested uredospores in the northern Caucasus during 1980-1985. Maximal loss of the infection potential occurred after the equivalent of 8-9 hours exposure to full sunlight. Exposure to sun in overcast conditions had no effect. Spore infectiousness increased with an increase in humidity, but air temperature had only a negligible effect. After sunlight inactivation, the uredospores were capable of partial recovery of their infectiousness. Figures 2; references 12: 6 Russian, 6 Western.

UDC 582.285.2

Effects of Various Cryopreservation Regimes on Biological Properties of *Puccinia graminis* F. sp. *Tritici* Eriksson et P. Henn Uredospores

907C0383D Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 23 No 5, Sep-Oct 89 (manuscript received 27 Dec 88) pp 449-454

[Article by V. G. Gennadiyev, T. K. Pykhtina and V. T. Sadkovskiy, North Caucasus Scientific Research Institute of Phytopathology, Krasnodar]

[Abstract] The goal of this study was to evaluate the effect of cryopreservation conditions on viability of uredospores, pathogens of yellow rust in wheat. Several freezing and thawing procedures were investigated. It was shown that *P. striiformis* uredospores are sensitive to the cooling and thawing rates: rapid freezing and rapid thawing (one- and two-stage) favored preservation of the viability of test samples. Even though cell damage can occur during either of these phases, it was not possible to show which was more damaging. Some of these changes were reversible, some were not. Overall, cryopreservation of *P. striiformis* was possible either in glass or in plastic containers. The most important factor was that both the freezing and thawing process be uniform throughout the specimen. Storage time had no effect on the biological properties. Figures 2; references 18: 4 Russian, 14 Western.

UDC 616.98:579.842.23]-092-07

Genetic Analysis and Modeling of Virulence of *Yersinia Pestis*

907C0227C Moscow MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 8, Aug 89 (Manuscript received 08 Dec 88) pp 42-47

[Article by V. V. Kutyrev, A. A. Filippov, N. Yu. Shavina, O. A. Protsenko, All-Union Scientific Research Anti-Plague Institute Mikrob, Saratov]

[Abstract] The purpose of this work was to determine in an isogenic system the leading "classical" virulence

factors of the plague microbe responsible for the development of the infectious process and to use the data obtained for genetic modeling of the virulence of the plague pathogen in experiments. It is found that the chromosomal marker Pgm⁺ and the calcium-dependent plasmid (pCad) are sufficient to preserve virulence in *Y. pestis*. Modeling of the virulence of the plague pathogen by genetic transfer methods allows possible determination of the value of the products of individual chromosomal and plasmid genes in development of the pathogenic properties of this microorganism and their functional role in various stages of development of the infectious process. Figures 1; References 30: 15 Russian, 16 Western.

UDC 576.851.49+616.9-085.33

Resistance of *Shigella* and *Salmonella* to Certain Antibiotics

907C0265B Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 6, Jun 89 (Manuscript received 1 Apr 87) pp 21-23

[Article by Sh. N. Nazarov, M. Sh. Sadykova, A. Kh. Rakhimova, and M. Yakubova, Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases, Uzbek Ministry of Public Health]

[Abstract] A study was made of the antibiotic resistance of 387 strains of *Shigella* and 257 strains of *Salmonella* isolated in Tashkent in 1979-1981 and in 1986. The studies showed that in 1979, strains of *Salmonella typhimurium* were more resistant to gentamicin, doxycycline, ampicillin, and rifampicin and more sensitive to polymyxin than *Shigella* was. In 1980-1981, statistically reliable sensitivity of *Shigella* to levomycetin, tetracycline, and streptomycin was established, with less sensitivity to monomycin and moderate sensitivity to erythromycin, in contrast to the strains of *Salmonella typhimurium*. Identical resistance of *Shigella* and *Salmonella* to polymyxin was observed. *Shigella* and *Salmonella* were found to be polyresistant to antibiotics commonly used in practice, with a significant difference in the sensitivity of *Shigella* and *Salmonella* to certain antibiotics. Antibiotic resistance was more clearly expressed in the *Salmonella* strains.

UDC 579.222.2:547.53

Utilization of Dimethylterephthalate by *Rhodococcus erythropolis*

907C0144A Moscow MIKROBIOLOGIYA in Russian Vol 58 No 3 May-Jun 89 (Manuscript received 22 Mar 88), pp 382-386

[Article by Z. M. Slizen, T. G. Zimenko, A. S. Samsonova, G. M. Volkova, Institute of Microbiology, Belorussian Academy of Sciences, Minsk]

[Abstract] Data are presented on the utilization of dimethylterephthalate (DMT) by a strain of *Rhodococcus*

erythropolis taken from the soil in an area affected by the emissions of a chemical plant. The *R. erythropolis* strain isolated utilizes DMT as its only source of carbon. The initial stages of DMT metabolism involve its conversion to monomethylterephthalate, to terephthalate, protocatechate and eventually to 3-ketoadipinate. The *R. erythropolis* strain was not the only microorganism found in the soil near the synthetic fiber plant capable of utilizing DMT as its only source of carbon. Other cultures were found in the genera *Pseudomonas*, *Micrococcus*, *Arthrobacter*, *Bacillus* and *Flavobacterium*, which are capable of consuming DMT in concentrations of up to 1 g/l. Figures 3; References 20: 2 Russian, 18 Western.

UDC 582.282.123.2.017.7

Biosynthesis of Leucyl-Tryptophanyl-Diketopiperazine by *Penicillium aurantio-virens* Culture and Characteristics of Its Production

907C0144B Moscow MIKROBIOLOGIYA in Russian Vol 58 No 3 May-Jun 89 (Manuscript received 16 May 88) pp 393-399

[Article by T. F. Soloveva, B. P. Baskunov, M. Yu. Nefedova, A. G. Kozlovskiy, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino]

[Abstract] This study continues a series of works searching for new alkaloid producers. The capability of the fungus *Penicillium aurantio-virens* F-230 for alkaloid production is studied, and the structure of an alkaloid substance isolated from the culture fluid of this fungus is determined, demonstrating that it is leucyl-tryptophanyl-diketopiperazine, a new alkaloid in the cyclical peptide class. The dynamics of its synthesis in the process of culture growth are studied. The change in content of the alkaloid in the process of growth of *P. aurantio-virens* F-230 correlates with the intracellular content of protein, the pool of free intracellular amino acids and, particularly, the content of the alkaloid precursors in the cells. The data indicate that leucyl-tryptophanyl-diketopiperazine participates in the balanced amino acid metabolism of the producing culture. Figures 1; References 11: 9 Russian, 2 Western.

UDC 579.846.21.017.7

Factors Increasing Resistance of *Thiobacillus ferrooxidans* to Molybdenum

907C0144C Moscow MIKROBIOLOGIYA in Russian Vol 58 No 3 May-Jun 89 (Manuscript received 09 Dec 87) pp 412-418

[Article by G. I. Karavayko, R. S. Dzhanugurova, T. A. Pivovarov, Institute of Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] The influence of molybdenum on *Thiobacillus ferrooxidans* has been studied since the late 1950's

in connection with attempts to utilize this microorganism to leach Mo from molybdenum ores. This article studies factors determining the resistance of *T. ferrooxidans* to molybdenum ions as it develops in a 9K medium containing FeSO_4 . It is shown that Mo^{6+} is unstable in the medium containing the bacteria and their metabolites and precipitates in direct proportion to its concentration. The resistance of *T. ferrooxidans* to the ion is influenced by pH (optimal growth pH 2.5) and the presence of organic substances, but is not determined by the concentration of biomass or iron ions. The iron ions thus have no protector properties. The protector properties are apparently provided by unidentified organic substances liberated by the *T. ferrooxidans* into the medium. These substances apparently form complexes with the molybdenum ions, which are nontoxic or have little toxicity for the bacteria. Figures 5; References 18: 7 Russian, 11 Western.

UDC 579.822.9.017.7

Influence of Trace Elements on Leaching of Manganese by *Achromobacter delicatulus*

907C0144D Moscow MIKROBIOLOGIYA in Russian
Vol 58 No 3 May-Jun 89 (Manuscript received
20 Jan 87) pp 426-429

[Article by M. Z. Serebryanaya and Z. Kh. Vishevnik,
Dnepropetrovsk State University]

[Abstract] A study is made of the influence of the salts of Mn, Fe, Zn, Cu and Co on the accumulation of acid metabolites in the culture fluid of *Achromobacter delicatulus*, and the optimal relationships are sought for trace elements that increase the rate of leaching of manganese from ore and slurry. The presence of Fe and Zn ions increases the excretion of the acid metabolites, the maximum accumulation of acids occurring at 0.01-0.1 percent MnCl_2 . The trace elements change the productivity of the active organic acid metabolites, indicating that the rate of this process can be controlled by maintaining the optimal relationship of trace elements in the medium. The following trace element contents increased the yield of acid metabolites by 61 percent: (1) MnCl_2 , 0.0016; FeCl_3 , 0.001; CuCl_2 , 0.000022; CoCl_2 , 0.000022; ZnCl_2 , 0.0022; (2) MnCl_2 , 0.001; FeCl_3 , 0.001; CuCl_2 , 0.00001; CoCl_2 , 0.00001; ZnCl_2 , 0.003. Figure 1; References 8: Russian.

UDC 579.842.11.04

Influence of Growth Rate and Cultivation Conditions on Stability of Plasmid pCJ55 and on Level of Expression of Large DNA Polymerase I Fragment Cloned in *Escherichia coli*

907C0144E Moscow MIKROBIOLOGIYA in Russian
Vol 58 No 3 May-Jun 89 (Manuscript received
14 Mar 88) pp 467-470

[Article by Ye. G. Kryukova, V. M. Nikolayeva, E. K. Ustinova, V. A. Yezhov, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino]

[Abstract] Gene engineering is widely used for the creation of microorganisms producing biologically active substances, including enzymes. However, cultivation of recombinant strains is hindered by their instability. A large fragment of DNA-polymerase I (the Klenov fragment) has polymerase and 3'-5'-exonuclease activities and is of theoretical and practical interest for gene engineering. The production of this enzyme is one of the most important tasks of biotechnology. A recombinant strain with this plasmid has been found to be quite unstable for nonselective cultivation. The purpose of this work was to select conditions and modes of cultivation providing stability of this plasmid and the maximum yield of the Klenov fragment, and also to study the influence of culture growth rate on the effectiveness of expression of the cloned gene. It is shown that the plasmid pCJ55 with the cloned gene of this fragment in *E. coli* is maintained stably in a population of the recombinant strain for batch and continuous cultivation in the presence of ampicillin. The level of expression of the Klenov fragment is determined by at least two factors: the stability of the recombinant strain and its specific growth rate. The maximum activity of the Klenov fragment is found after thermal induction of a culture growing at 0.6 hr^{-1} on a synthetic medium containing bactopectone and glucose as the carbon source. Figures 2; References 8: 2 Russian, 6 Western.

UDC 632.934.1:631.46

Degradation of Chlorophenols by Soil Microflora with Eh Gradient

907C0144F Moscow MIKROBIOLOGIYA in Russian
Vol 58 No 3 May-Jun 89 (Manuscript received
26 Apr 88) pp 501-506

[Article by S. N. Gorlatov, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino]

[Abstract] Chlorosubstituted phenols, among the most resistant to the microbial action of compounds, are products of incomplete degradation of a number of pesticides which are widely used in agriculture. The possibility of degradation of these compounds by soil microflora has been studied very little. The purpose of this work is to study the capability of soil microflora to degrade chlorinated phenols with an Eh gradient and in the presence of various inorganic electron acceptors. The resistance of the chloroaromatic substances to microbial degradation varied directly with the quantity of chlorine in the aromatic ring. The residual content of DCP and TCP was decreased in the presence of sulfate. The process of degradation was accompanied by the liberation of mineral chlorine. Cultures produced in liquid media dechlorinated 2,4-DCP in 1-2 weeks and a considerable portion of 2,4,5-TCP within a few months. The residual content of both substances in anarobic zones with Eh 90-195 mV averaged 6.9 mg/l and 28.2 mg/l. Figure 1; References 5: Russian.

UDC 577.152.314.14

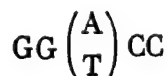
Determination of Substrate Specificity of Restriction Endonucleases Bme 18 I and Kzo 9 I

907C0486 Novosibirsk IZVESTIYA SIBIRSKOGO
OTDELENIYA AKADEMII NAUK SSSR: SERIYA
BIOLOGICHESKIKH NAUK in Russian No3,
Dec 89 pp 25-26

[Article by S. Kh. Degtyarev, N. I. Rechkunova, A. A.
Grinev and V. S. Dedkov; All-Union Scientific Research
Institute of Biology, NPO "Vektor", Koltsovo]

[Text] During a study of natural isolators, we observed
strains *Bacillus megaterium* 18 and *Kurthia zopfii* 9 and
isolated from them, by the Green et al. method [1],
restriction endonucleases Bme 18 I and Kzo 9 I respec-
tively, named according to the generally accepted
nomenclature [2].

The enzyme Bme 18 I recognizes sequence



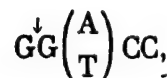
and is an isoschizomer of restrictase Ava II and Kzo 9 I
recognizes the sequence GATC and is an isoschizomer of
restrictase Sau 3A.

Restriction endonucleases Ava II and Sau 3A are used
extensively in genetic engineering studies, however,
these producer-strains are difficult to cultivate and, due
to this, may be replaced by more technological strains *B.*
*megaterium*18 and *Kurthia zopfii*9 respectively.

In order to confirm the recognition sequences and to
determine the place of DNA splitting by these enzymes,

we used the Maksam and Gilbert method [3]. We hydro-
lyzed 10 µg of pBR 322 DNA, sequentially, by
restrictases Sal I and Pvu II and methyl with the aid of a
Klenov fragment and α-³²P/TTP We isolated the 1415
n. p. long labelled fragment obtained from PAAG and
determined its structure by a standard method (see
figure, tracks 2-5). We hydrolyzed it in parallel by
enzymes Bme 18 I and Kzo 9 I in a buffer containing
0.02 M tri-HCl pH 7.5; we mixed 0.01 M MgCl₂, 0.05 M
NaCl and 0.006 M 2-mercaptoethanol and aliquots of
the incubation mixture with formamide and applied it to
a gel (see figure a, track 1 and figure b, track 1, respec-
tively). From figure a, we see that the mobility of Sal
I-Bme 18 I of the DNA fragment coincides with the
mobility of the product of chemical splitting for the first
residue G in the sequence GGTC. In part b of the
figure, the position of Sal I—Kzo 9 I—DNA fragment
coincides with the mobility of the product of chemical
splitting for the nucleotide residue C, adjacent to the
5'-terminus of the sequence GATC.

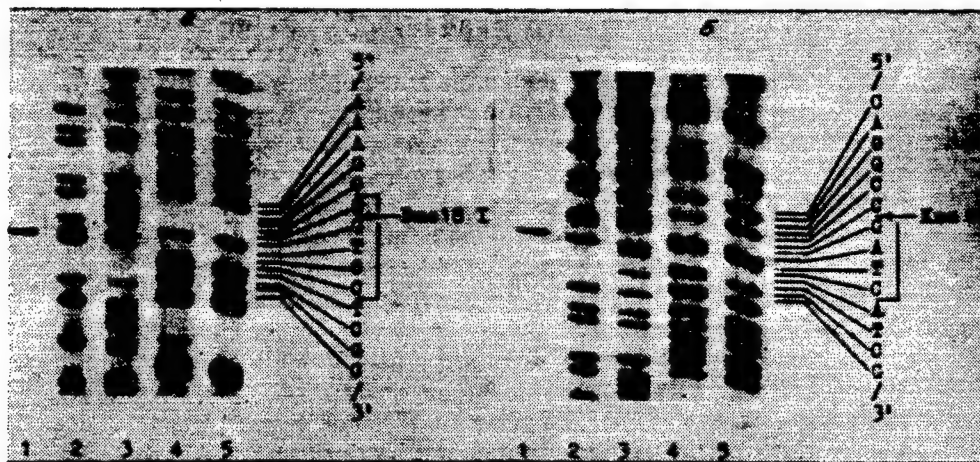
It was shown earlier [4, 5] that, with use of this method,
the site of DNA splitting by restriction endonuclease is a
phosphodiether bond between the base, obtained during
enzymic hydrolysis and that following in gel. Conse-
quently, restrictase Bme 18 I recognizes and splits the
sequence



and restrictase Kzo 9 I recognizes and splits the sequence



(hydrolysis site is indicated by an arrow).



Radioautograph of 4 percent PAAG after electrophoresis of products of enzymic and chemical splitting of ³²P/-la-
belled Sal I—Pvu II of pBR 322 DNA fragment. Tracks: 2—splitting for G, 3—splitting for G + A, 4—splitting for
T + C, 5—splitting for C. a. 1—splitting by restrictase Bme 18 I. b. 1—splitting by restrictase Kzo 9 I. Arrows indi-
cate the place of splitting of restrictases. Brackets indicate recognition sequences.

Thus, restriction endonucleases Bme 18 I and Kzo 9 I isolated by us are complete isoschizomers of restriction endonucleases Ava II and Sau 3 A and may replace them in genetic engineering studies.

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UDC 575.852'112:578.74:615.371

Guidelines for Vaccine Engineering Based on Peptide Fragment Variability of Closely Related Proteins

907C0795A Moscow MOLEKULARNAYA BIOLOGIYA in Russian Vol 24 No 3, May-Jun 90 (manuscript received 15 May 89) pp 638-648

[Article by A. M. Yeroshkin, V. I. Fomin, P. A. Zhilkin and V. A. Kulichkov, All-Union Scientific Research Institute of Molecular Biology, "Vektor" Scientific Industrial Association, Koltsovo, Novosibirsk]

[Abstract] Empirical studies were conducted on variability of peptide fragments derived from closely related proteins to determine parameters important in vaccine engineering. The purpose was to assess those physicochemical characteristics that may be modified while retaining fundamental protein function. The experimental approach consisted of analysis of a data bank on 465 variable fragments derived from 383 protein pairs belonging to 92 superfamilies. The results, including a study of the HBsAg protein of hepatitis B virus envelope, led to delineation of permissible degrees of variation. In general, the findings demonstrated that significant amino acid substitutions in the N-terminus that affect bulk and net charge are to be avoided, and that changes in centrally positioned amino acid substitutions should not affect bulk or charge, although changes in polarity and hydrophobicity can be tolerated. Finally, significant alterations can be made in the C-terminal amino acids without having a serious impact on protein function. On an overall basis, the data indicated that amino acid substitutions in peptide fragments should involve amino acids that possess physicochemical properties that approximate those of the amino acids in the native protein. Figures 4; tables 6; references 18: 4 Russian, 14 Western.

UDC 577.21

Cloning and Expression of Thermostable Pullulanase Gene of Clostridium thermohydrosulfuricum in Escherichia coli

907C0795B Moscow MOLEKULARNAYA BIOLOGIYA in Russian Vol 24 No 3, May-Jun 90 (manuscript received 25 Oct 89) pp 736-743

[Article by D. G. Kozlov, N. Ye. Kurepina*, Ye. V. Glushchenko, M. A. Mogutov and S. M. Podkovyrov*, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow; *Institute of Molecular Genetics, USSR Academy of Sciences, Moscow]

[Abstract] Technical details are presented on the use of plasmid pUC19-based gene library of Clostridium thermohydrosulfuricum 39E for studies on the cloning and expression of the thermostable pullulanase (pul) gene in Escherichia coli. Subsequent sequencing studies led to identification of the 1-431 nucleotide sequence of the 5'-end of the pul gene. Expression in E. coli led to a production level of pullulanase which accounted for ca. 10 percent of total cell protein, with some 95 percent of the enzyme activity demonstrating cytoplasmic localization. Accordingly, the address sequence differs in the two bacterial genera, since in Cl. thermohydrosulfuricum pullulanase is surface-bound. Figures 4; references 22: 3 Russian, 18 Western.

UDC 577.218

Effect of Strong Plant Promoter on Expression of E. coli B-Glucuronidase Gene in Transgenic Potato Callus

907C0795C Moscow MOLEKULARNAYA BIOLOGIYA in Russian Vol 24 No 3, May-Jun 90 (manuscript received 5 Oct 90) pp 752-756

[Article by A. L. Gartel, V. A. Avetisov, G. I. Sobolkova, A. G. Kazantsev, K. G. Gazaryan and O. S. Melik-Sarkisov, All-Union Scientific Research Institute of Agricultural Biotechnology, Moscow; Institute of Molecular Genetics, USSR Academy of Sciences, Moscow]

[Abstract] Genetic engineering experiments were designed to test the efficiency of strong 35S RNA promoter of cabbage mosaic virus on the expression of E. coli β -glucuronidase gene in potato callus and mature plant organs. Accordingly, Agrobacterium tumefaciens A281, bearing plasmid pBI121 carrying kanamycin kinase and the β -glucuronidase genes in conjunction with nopal synthetase and 35S RNA promoters, were used for infection of tuber slices and leaf sections of Izobiliye and Domodedovskiy potatoes. Subsequent growth of the tissues in the presence of 50-200 μ m/ml of kanamycin and enzymatic studies demonstrated synthesis of kanamycin kinase and β -glucuronidase in callus

and mature plant organs. Expression of the β -glucuronidase gene was equivalent in both types of tissue and on the order of 330-3000 pmoles/min/mg of protein. These observations provided further confirmation for the efficiency of the 35S RNA promoter in both types of tissues. Figures 4; tables 1; references 12 (Western)

UDC 517.213.32;578.825.13

Amplification of EBV and HIV DNA Sequences by *Thermus thermophilus* DNA-Polymerase

907C0795D Moscow MOLEKULYARNAYA
BIOLOGIYA in Russian Vol 24 No 3, May-Jun 90
(manuscript received 29 Nov 89) pp 781-787

[Article by A. I. Glukhov, S. A. Gordeyev, S. V. Vinogradov, V. I. Kiselev, V. M. Kramarov*, O. I. Kiselev* and Ye. S. Severin, Scientific Center for Molecular Diagnosis (Moscow) and *All-Union Scientific Research Institute of Influenza (Leningrad), USSR Ministry of Health]

[Abstract] Studies were conducted on the use of *Thermus thermophilus* DNA-polymerase (80-86 kD), in place of the more commonly employed *Thermus aquaticus* enzyme (62-68 kD), in polymerase chain reactions designed for cyclic amplification of HIV and EBV DNA sequences. Amplification and identification of specific DNA sequences was attained with oligonucleotide primers for the gag region of HIV and the oriP region of EBV. The results showed that employing two temperature cycles of 96 and 72°C reduced the amplification times and provided specific nucleotide probes suitable for diagnosis of the respective virus in infected cells. Although the two temperatures cycle led to accumulation of nonspecific DNA which encumbered visual analysis of electrophoretic gels, such DNA did not interfere with hybridization analysis. Figures 6; references 19 (Western).

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UDC 577.218

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907C0795C Moscow MOLEKULYARNAYA
BIOLOGIYA in Russian Vol 24 No 3, May-Jun 90
(manuscript received 5 Oct 90) pp 752-756

[Article by A. L. Gartel, V. A. Avetisov, G. I. Sobolkova, A. G. Kazantsev, K. G. Gazaryan and O. S. Melik-Sarkisov, All-Union Scientific Research Institute of Agricultural Biotechnology, Moscow; Institute of Molecular Genetics, USSR Academy of Sciences, Moscow]

[Abstract] Genetic engineering experiments were designed to test the efficiency of strong 35S RNA promoter of cabbage mosaic virus on the expression of *E. coli* β -glucuronidase gene in potato callus and mature plant organs. Accordingly, *Agrobacterium tumefaciens* A281, bearing plasmid pBI121 carrying kanamycin kinase and the β -glucuronidase genes in conjunction with nopal synthetase and 35S RNA promoters, were used for infection of tuber slices and leaf sections of Izobiliye and Domodedovskiy potatoes. Subsequent growth of the tissues in the presence of 50-200 μ M/ml of kanamycin and enzymatic studies demonstrated synthesis of kanamycin kinase and β -glucuronidase in callus and mature plant organs. Expression of the β -glucuronidase gene was equivalent in both types of tissue and on the order of 330-3000 pmoles/min/mg of protein. These observations provided further confirmation for the efficiency of the 35S RNA promoter in both types of tissues. Figures 4; tables 1; references 12 (Western)

UDC 616.33-002.44-085.84

Use of Electromagnetic Radiation in Millimeter Range to Treat Stomach Ulcers

907C0824 Kiev VRACHEBNOYE DELO in Russian No 5, May 90 pp 6-9

[Article by V. B. Dogotar, S. M. Tkach, V. G. Perederiy and Yu. G. Kuzenko; Chair of Facultative Therapy 1 (head—professor V. G. Perederiy); Kiev Medical Institute]

[Abstract] A study of the effectiveness of treating ulcers by microwave resonance therapy, determination of indications and contraindications for such treatment and development of optimal course doses and single doses for such treatment involved 165 ulcer patients. Of these 125 underwent a course of microwave resonance therapy in the form of monotherapy (5-10 sessions). 21 patients

had peptic ulcer and 104 had duodenal ulcer. The patients ranged in age from 16-58 years; 80 percent of the patients were men and 20 percent were women. Diagnosis and effectiveness of treatment were determined by endoscopy. Effectiveness of microwave resonance therapy was compared to that of traditional therapy. Microwave resonance therapy produced earlier remission, according to endoscopic assessment, decreased the frequency of relapse somewhat and increased the absence of side effects. Relatively low cost of the treatment justified recommendation of it for treatment of uncomplicated duodenal ulcer especially for patients with short anamnesis of the disease. Microwave resonance therapy was not recommended for treatment of patients with such concomitant diseases as kidney stone disease and cholelithiasis nor for treatment of complicated forms of ulcer disease. References 3 (Russian).

UDC 615.214.31:547.466.6

**N-acyl Derivatives of D, L-Aspartic Acid:
Synthesis, Psychotropic Properties and Effect on
³H-glutamate From Cerebral Membranes**

907C0825 Moscow

KHIMIKO-FARMATSEVTICHESKIY ZHURNAL
in Russian Vol 24 No 5, May 90 pp 17-20

[Article by G. V. Kovalev, A. I. Rakhimov, V. A. Sazhin et al.; Volgograd Medical Institute; Volgograd Polytechnical Institute]

[Abstract] A study of psychotropic properties and acute toxicity of N-acyl derivatives of aspartic acid and of the effect of these substances on specific binding of ³H-glutamate from rat brain membranes involved experiments on 250 white rats (weight 180-250 g) of both sexes and 80 white mice (weight 18-21 g). Effect of N-acyl derivatives of aspartic acid on rat behavior was tested in "open field" test and by forced swimming. N-butyryl, adamantanoyl and palmitoyl derivatives produced psychostimulative and antidepressant effects while N-butyryl aspartate produced an anti-amnesic effect. N-acyl analogs of aspartic acid did not affect specific binding of ³H-glutamate to rat brain membranes. It was assumed that the substances activate glutamate-ergic and aspartate-ergic neurons, influencing nerve cell metabolism. After penetrating the blood-brain barrier, they decompose in the brain into carboxylic acid and aspartic acid and this stimulates specific receptors of the excitatory amino acids. References 7: 1 Russian; 6 Western.

UDC 616-001.49-08

**Alteration of Renal Osmotic Regulation by
Various Doses of Cobra Venom**

907C0406H Ashkhabad ZDRAVOOKHRANENIYE
TURKMENISTANA in Russian No 9, Sep 89 pp 36-39

[Article by A. T. Berdyeva and B. B. Batyrov, Chair of Biology, Turkmen Order of People's Friendship State Medical Institute; Turkmen Scientific Research Institute of Maternal and Child Health]

[Abstract] A dose-effect analysis was conducted on the effects of cobra venom on plasma and urine osmolarity and renal clearance of osmotically active substances. The study employed male and female rats (170-220 g) treated intramuscularly with 0.1, 0.3, 0.5 and 1.0 LD₅₀ doses of cobra venom. Evaluation of the parameters of interest demonstrated a number of dose-dependent changes, indicative of progressive deterioration of renal tubular transport mechanisms with the two higher doses. The changes, in general, were indicative of the fact that while the effects of the 0.1 and 0.3 LD₅₀ doses were reversible, those induced by higher levels of the venom were frankly pathogenic. Four hours after administration of the full lethal dose, the animals succumbed with manifestations of acute cardiorespiratory failure, with the majority

exhibiting hypersalivation and tachypnea. These findings demonstrated the fact that renal failure is a significant component in cobra venom pathogenesis. References 8: 6 Russian, 2 Western.

UDC

616.155.33-008.1-02:613.863]-085.214.2:577.175.82

**Post-Stressor Correction of Macrophage
Functional Activity by Tuftsin and Its Derivatives**

907C0203D Moscow BYULLETEN

EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 108 No 7, Jul 89 (Manuscript received
17 Aug 88) pp 64-67

[Article by N. R. Bulatova, Ye. A. Romanova, A. V. Krinskaya, Ye. I. Sarychev, A. V. Valdman, Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow]

[Abstract] The tetrapeptide tuftsin is a highly active hormone-like peptide with clear pleiotropic activity. In order to seek approaches to the pharmacologic correction of post-stressor immune disorders and phagocyte functioning, this article studies the influence of tuftsin and its derivatives on the functional state of mononuclear phagocytes in rats with experimental neurosis. Artificial psychoemotional stress decreased macrophage functional activity and caused leukopenia. Tuftsin did not restore stress-induced depression of macrophage activity, but did cause an increase in mass of the adrenal glands and pronounced granulocyte monocytosis. A pentapeptide analog of tuftsin caused additional inhibition of nitrosine tetrazole activity. The heptapeptide analog stimulated restored macrophage activity and lymphopoiesis.

UDC 616.24-008.4-092.9-085.357:577.175.829]-
036.8-07

**Restoration of Disturbed Respiratory Activity In
Cats by Thyrolyberin Analog (PR-546) Devoid of
Hormonal Properties**

907C0203A Moscow BYULLETEN

EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 108 No 7, Jul 89 (Manuscript received
10 Nov 88) pp 32-35

[Article by I. Ye. Gurskaya, Ts. V. Serbenyuk, A. D. Slyuta, P. Ya. Romanovskiy, Department of Human and Animal Physiology, Biology Faculty, Moscow State University]

[Abstract] The relatively high concentrations of the thyrotropin-releasing hormone thyrolyberin in the respiratory center and its clear activating effect on respiration upon exogenous administration in various classes of vertebrates indicates that the dipeptide plays a significant role in the regulation of respiration. Of particular interest is the observation of restoration of the disturbed

respiratory activity under the influence of this peptide in cases of hemorrhagic shock. The presence of hormonal effects of thyroliberin has forced a search for analogs having the same stimulating effect on respiration, but no hormonal properties. This article reports on a thyroliberin analog synthesized at the Institute of Organic Synthesis, Latvian Academy of Sciences, Riga, which does not induce the secretion of hormones. In doses of 100-500 $\mu\text{g/kg}$ i/v, PR-546 restored respiration after disturbances caused by loss of 40-70 percent of blood volume in cats. This stimulating effect on homoeothermic respiration indicates that the substance may be useful for emergency medicine. References 9: 4 Russian, 5 Western.

UDC 616.831-02:615.362.438.017:615.276.4]-092-9-07

Effect of Thymosin and B-Activin on Lateralization of Sensomotor Control in Rats

907C0280B Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 108 No 8, Aug 89 pp 139-142

[Article by V. P. Dobrynin, V. A. Fedan, I. Yu. Orbachevskaya, Ye. N. Pogozheva and Ye. S. Neprintseva, Scientific Research Institute of General Pathology and Pathological Physiology, USSR Academy of Medical Sciences; Scientific Research Laboratory of Biologically Active Substances of Hydrobionts, USSR Ministry of Health, Moscow]

[Abstract] A study of the role of the endogenous peptide regulators thymosin and B-activin as lateralized (selective) modulators of functions of the right hemisphere and left hemisphere included experiments on 74 outbred rats (200-250 g) placed in one of two groups. Thymosin (fraction 5) was obtained from Greenland seal thymus. Thymosin or B-activin was injected intraperitoneally in a 0.5-1 mg/kg dose 20-30 minutes before the experiment began, with assessment of lateralization of sensomotor control according to the following indicators: lateralization of runs, lateralization of the food-searching reaction, direction and number of spontaneous rotations and preference for use of the right or left paw. Thymosin and B-activin produced opposite effects at different stages of the food-searching behavior. Thymosin shifted lateralization of motor control toward the side of the left

hemisphere, activating it. The possibility of use of these peptides for directed effect on the course of the compensatory-restorative process in the central nervous system in order to optimize its development was confirmed. Figures 2; references 14: 10 Russian; 4 Western.

UDC

612.821.1/.3.014.49.06:615.357.814.32:577.175.325

Cyclic Analogs of ACTH Fragments in Organization of Self-stimulation and Grooming Behavior in Rabbits

907C0280E Moscow BYULLETEN
EKSPERIMENTALNOY BIOLOGII I MEDITSINY
in Russian Vol 108 No 8, Aug 89 pp 214-216

[Article by R. A. Burchuladze, I. K. Liyepkaula, P. Ya. Romanovskiy and G. I. Chipens, Laboratory of Physiology of the Emotions, Scientific Research Institute of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] A study of cyclic analogs of ACTH fragments containing in their composition structures of specific and non-specific active centers EHFRWGKPGV-NH₂ and KHFRWG-NH₂ in the organization of self-stimulation and grooming behavior involved experiments on 20 male Chinchilla rabbits (weight 3-3.5 kg). The experiments showed an ambiguous effect on self-stimulation behavior in the rabbits. Intracerebroventricular injection of EHFRWGKPGV-NH₂ in a 0.1-2.5 μ dose increased self-stimulation frequency by 42-45 percent within 5 minutes after injection and increased it further, by 50-75 percent, within 15 minutes after injection, and then decreased it gradually with return to baseline level within 48-72 hours. Injection of 4-5 μ doses of this fragment decreased the frequency of self-stimulation by 25-30 percent within the first five minutes, with return to baseline within 72 hours. Injection of 0.1-5 μ of KHFRWG-NH₂ reduced the frequency of self-stimulation by 25-30 percent within the first 15 minutes. It then returned to the baseline level and decreased again. Within 24-28 hours it increased to 5-8 percent above baseline and remained unchanged for 2 hours. Both fragments reduced the duration of grooming by the rabbits by 200-400 percent. The effects of the fragments lasted for 72 hours. Figures 12; references 11: 3 Russian; 9 Western.

UDC

616.419-003.971-02:613.863]-02:615.31:[547.95:547.943

Regulatory Effects of Opioid Peptides on Bone Marrow Hemopoiesis Under Stress

907C0280F Moscow BYULLETEN

EKSPERIMENTALNOY BIOLOGII I MEDITSINY

in Russian Vol 108 No 8, Aug 89 pp 216-219

[Article by Ye. D. Goldberg, A. M. Dygay, O. Yu. Zakharova and V. P. Shakhov; Scientific Research Institute of Pharmacology, Tomsk Scientific Center, USSR Academy of Medical Sciences]

[Abstract] A study of possible pathways of the effect of opioids on hemopoietic tissue reaction under stress and especially their interaction with known regulatory mechanisms involved experiments on 294 F₁(CBAXC57L/6) male mice and 312 non-inbred male mice (weight 18-20 g) subjected to 10-hour and 6-hour immobilization respectively. Mice were injected one time intraperitoneally with 100 mg/kg of leu-enkephalin or its synthetic analog dalargin within 6 hours after start of immobilization. The enkephalins modulated the bone marrow hematopoiesis under stress and affected the activity of other regulatory systems, especially the glucocorticoid and T-lymphocytic systems. The effect of the opioids may be realized directly through receptors on hemopoietic precursors or on cellular elements forming a hemopoiesis-inducing microenvironment (T-lymphocytes, macrophages, stromal mechanocytes) by changing elaboration of short-distal humoral factors which regulate proliferation and differentiation of hemopoietic precursor cells. References 14: 11 Russian; 3 Western.

UDC 612.8.012

Dalargin Potentiates Chronotropic Effects of Acetylcholine on Frog Heart

907C0257 Moscow VESTNIK MOSKOVSKOGO

UNIVERSITETA: BIOLOGIYA in Russian No 3, Jul-Sep 89 (Manuscript received 25 Apr 88) pp 9-12

[Article by N. A. Sokolova, L. D. Kuligina, and I. P. Ashmarin]

[Abstract] Dalargin is a synthetic analog of a Leu-enkephalin and has been found to have a positive effect in acute myocardial infarction and various types of arrhythmia. This article studies the influence of dalargin

on the negative chronotropic effects of acetylcholine on the heart. Experiments were performed on an isolated frog heart. Dalargin was found to potentiate the chronotropic effects of exogenous acetylcholine in contrast to the results obtained in similar studies using the natural opioid peptide denorphin, which attenuated the effects of acetylcholine considerably. The results indicate a significant internal connection between the cholinergic and opioidergic systems and the capability of opioid peptides for polyfunctional modulation of the parasympathetic regulation of the heart. Figure 1; References 8: 6 Russian, 2 Western.

UDC 547.298.1+547.554

Polymeric Effects in Antiarrhythmic and Anesthetizing Activities of Fatty Aromatic Aminoamides

907C0019A Moscow DOKLADY AKADEMII NAUK

SSSR in Russian Vol 313 No 3, Jun 90 (manuscript received 2 Feb 90) pp 623-627

[Article by M. I. Cherkashin, Ye. Ya. Borisova, V. M. Komarov, A. N. Zubov and academician G. A. Tolshtikov, Institute of Chemical Physics imeni N. N. Semenov, USSR Academy of Sciences, Moscow; Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov]

[Abstract] In vitro screening was conducted with a series of fatty aromatic aminoamides to assess the importance of the polymeric factor in antiarrhythmic and anesthetic effects. The fatty aromatic N-substituted aminoamides were synthesized by condensation of amino alcohols with nitriles in reactions catalyzed by sulfuric acid or sulfuric acid + phosphoric acid combinations. The yield of the products ranges from ca. 65 to 86 percent. Testing of the agents involved monitoring their effects on sodium currents in murine neuroblastoma cells, clonal line N18A-1. The results revealed that the agents in question possess marked antiarrhythmic and anesthetizing effects, exceeding those of novocainamide and novocaine. Maximum activities were shown by compounds with n = 6 for aminoamidoheptane series and with n = 7 for the aminoamidooctanes. The mechanism of action evidently rested on blocking open and closed ion channels. SAR demonstrated that the channels are blocked most efficiently when the distance between the active centers of the receptors corresponds to the distance between the amine and amido groups of the aminoamides (5.41 Å for n = 6; 5.80 Å for n = 7). Tables 5; references 10: 8 Russian, 2 Western.

UDC 502.747:591.111.1

Regulation of Erythrocyte Membrane Resistance to Extreme Factors by Tris-(2-Hydroxyethyl) Ammonium 4-Fluorophenylsulfonylacetate*907C0732D Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 311 No 4, Apr 90 (manuscript received 31 Mar 89) pp 1000-1002*

[Article by T. V. Nefedova, M. I. Boyko, V. B. Kazimirovskaya, A. A. Ivanov, G. G. Levkovskaya, S. A. Guseva, A. A. Bryuzgin, and M. G. Voronkov, corresponding member, USSR Academy of Sciences, Irkutsk Institute of Organic Chemistry, Siberian Division, USSR Academy of Sciences]

[Abstract] A search was conducted for agents capable of protecting erythrocytes from toxicants, since erythrocytes constitute one of the first target sites attacked by exogenous agents. In vitro studies demonstrated that preincubation of chinchilla rabbit erythrocytes with 10^{-7} to 10^{-4} M tris-(2-hydroxyethyl) ammonium 4-fluorophenylsulfonylacetate (TFA) increased their resistance to hemolysis by ultrasound (0.4 W/cm^2) by 17-40 percent, to lysis by 0.002 N HCl by 12-39 percent, and to destruction by 0.007 percent Merck's saponin by 5-12 percent. In addition, 10^{-3} M TFA limited hemolysis to 10 percent following 19.2 kGy gamma irradiation from a Co-60 source. In vivo rabbit studies demonstrated that intravenously administered 15 mg/kg of TFA also enhanced erythrocyte resistance to hemolysis by HCl and saponin. These findings were interpreted to indicate that TFA stabilized protein-lipid complexes in the membranes, with additional studies demonstrating that TFA inhibited lipid peroxidation. Consequently, TFA may find application in enhancing peripheral perfusion and erythrocyte stability in capillary circulation. Figures 2; tables 2; references 15: 14 Russian, 1 Western.

UDC 612.172.2:612.13+6+ :201+6-092

Automated Automated Systems in Complex Evaluation of Health and Adaptive Capacities of Man*907C0837A Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 16 No 3, May-Jun 90 pp 94-100*

[Article by E. M. Kazin, A. D. Rifmin, A. I. Fedorov et al; Kemerovo State University]

[Abstract] The possibility of the use of cardio-vascular system indicators to diagnose the functional state of the organism has been expanded significantly by use of automatic systems for processing electrophysiological data. A study of the adaptive capacities of the organism according to parameters of the circulatory system and autonomic regulation in stationary and transitional processes with the aid of automated programs involved 170 male and female university teachers and associates ranging in age from 25-50 years. These programs make it

possible to standardize results of examinations and ensure their mass nature and also to evaluate individual features of reactivity and functional reserves of the body with consideration of the person's constitutional type. The studies used an inexpensive computer complex based on "Elektronika-DZ-28" and a rhythm cardiometer RKM-01 which is suitable for individual and mass analysis of prenosological states. The study showed that the automated systems could be used to assess adaptive capacity of the circulatory system and entire body under stationary conditions and in the dynamics of a transitional process with consideration of the body type and type of functional reaction. Use of the computer complexes in analysis of parameters of autonomic and myocardial-hemodynamic complexes revealed the level of functional reserve and made it possible to use these findings to recommend steps for optimization of labor and leisure activities and to designate methods for restoration of physical and mental reserves of health. Figures 3; references 20 (Russian).

UDC 612.821

Formation of "Cold-In-Reserve" in Palms During Increasing Nervous-Emotional Stress*907C0837B Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 16 No 3, May-Jun 90 pp 101-106*

[Article by A. A. Krauklis and A. A. Aldersons; Latvian Scientific Research Institute of Experimental and Clinical Medicine, Riga]

[Abstract] A study of the role of prognosticating mechanisms of the brain and heat and energy exchange of the organism in the origin and dynamics of cutaneous-galvanic reactions and heat emission from the palms during psycho-emotional and physical stresses involved examination of 864 healthy subjects of both sexes, ranging in age from 16-56 years; 610 of whom were in the age range of 21-23 years. A "visual search" for 10 minutes under hurried conditions with "penalty" stimuli evoked psychoemotional stress and bicycling at the rate of 60 revolutions per minute for 10 minutes caused physical stress. The studies confirmed the previously advanced hypothesis concerning the existence of a specific autonomic component of nervous-emotional stress involving formation, in the distal sections of the body, of "cold-in-reserve" which ensures conditions for operative and delicately dosed elimination of excess heat from the body. The intensity of heat emission and the amount of "cold-in-reserve" were closely connected with the predicting and general-preparational functions of the higher nervous system. The amount and dynamics of "cold-in-reserve" may serve as an adequate quantitative criterion of normal reactivity, hypo-reactivity and hyper-reactivity to stressors, signalling the probable entry of increase of psychoemotional stress or physical stress. Figure 1; references 20: 18 Russian; 2 Western.

UDC 612.017+615.32:57.017.32

Adaptation to Natural and Technogenic Extremal Factors in Trained and Untrained Persons Under Effect of Adaptogens

907C0837C Moscow FIZIOLOGIYA CHELOVEKA
in Russian Vol 16 No 3, May-Jun 90 pp 114-119

[Article by A. V. Lupandin; Institute of Physical Culture; Khabarovsk]

[Abstract] A group of physically highly-qualified sportsmen (62 men ranging in age from 19-30 years) and a group of untrained subjects (58 men ranging in age from 19-23 years) underwent evaluation of specific power (W/kg), developed during a heart rate of 170 beats per minute. Subjects were checked at the beginning of the studies and after 1, 2, 4, 7, 14 and 21 days while using adaptogens (2g of extract of magnolia and 200 mg of Saparal), tocopherol (100 mg) or combinations of these. The trained sportsmen received these after emotional stress caused by competitions. Coordination of movements in Aeroflot stewardesses was determined before and after 7-9 hour flights without landing while using 0.5 g of extract of magnolia or a placebo. The difference in dynamics of resistance to physical stress during use of adaptogens in trained and untrained persons was attributed to different mechanisms of action of polyphenol adaptogens. The slow increase of adaptogenic effect in trained persons resulted from the anti-oxidant action inherent in polyphenol adaptogens. In the untrained persons, it was attributed to the predominant effect of adaptogens on the regulating system and was connected with selective modulation of catecholamine-ergic synapses of the sympatho-adrenal system, appearing in the form of rapid adaptation. Effects of polyphenol adaptogens during the effect of technogenic extremal factors occurred predominantly by means of correction of regulating systems, rapidly optimizing behavioral adaptation and partially because of the antioxidant action inherent in it. References 24: 19 Russian; 5 Western.

UDC 612.215.8+612.018

Effect of Thyroliberin on Pulmonary and Bronchial Blood Circulation After Intravenous and Intranasal Administration

907C0826A Leningrad FIZIOLOGICHESKIY
ZHURNAL SSSR IMENI I. M. SECHENOVA
in Russian Vol 76 No 5, May 90 pp 702-707

[Article by A. M. Kulik, N. V. Sanotskaya, Ys. V. Serbenyuk et al.; Laboratory of Pathophysiology of Respiration (director A. M. Kulik), Bioengineering Laboratory (director V. S. Sinyakov), Scientific Research Institute of General Pathology and Pathological Physiology USSR Academy of Sciences and Chair of Animal Physiology (chief I. P. Ashmarin of Biological Faculty of the State University imeni M. V. Lomonosov, Moscow)]

[Abstract] A study of the effect of thyroliberin (thyrotropin-releasing hormone) on pulmonary and bronchial blood circulation involved acute experiments on 25 2.5-5.0 kg cats of both sexes with open thorax during artificial pulmonary ventilation under pentobarbital narcosis (40-50 mg/kg) by an ultrasound method assessed the linear and volumetric rate of blood flow in the left lower lobar arteries and vein. The balance between right ventricular and left ventricular ejection was assessed in some experiments. Intravenous injection of 100 µg/ml revealed 2 phases of reaction. The 1st phase appeared within 15-20 seconds after thyroliberin injection and produced a rather pronounced increase of systemic pressure of up to 115-120 percent in 14 of 18 cases, an insignificant increase of pressure in the pulmonary artery of up to 105-108 percent in 8 of 12 cases, accompanied by an increase of up to 115 percent of the initial level of pulmonary vascular resistance. Intranasal administration of thyroliberin produced reactions the opposite to those occurring after intravenous injection. Pulmonary arterial pressure decreased. Resistance of the vascular river of the lungs decreased. Reduction of blood flow along the pulmonary artery and vein occurred. There are some indications of activation by thyroliberin of the catecholaminergic neurons of the brain with increase of synthesis and release of catecholamines due to the pharmacologic effect of thyroliberin and indications of possible mediation of many pharmacological effects of thyroliberin by activation of cholinergic systems. The study showed that thyroliberin in pharmacological concentrations produced a 2-phase effect on basic parameters of pulmonary hemodynamics. Nasal administration of the drug produced opposite effects to those arising after intravenous injection. Figures 3; references 13: 7 Russian; 6 Western.

UDC 577.352.5

Two Components of High-threshold Calcium Current With Different Sensitivity to Omega-Conotoxin in Membrane of Pheochromocytoma Cells

907C0826B Kiev NEYROFIZIOLOGIYA in Russian
Vol 22 No 3, May-Jun 90 pp 397-400

[Article by N. Kh. Pogorelaya, A. N. Savchenko, A. N. Verkhatskiy and Ya. M. Shuba; Institute of Physiology imeni A. A. Bogomoletz, UkSSR Academy of Sciences, Kiev]

[Abstract] Patch-clamp recordings of whole-cell currents in cultured cells of pheochromocytoma PC12 explained the blocking of high-threshold calcium currents by omega-conotoxin (CgTx). The 2-component nature of high-threshold calcium current of the membrane of cultured cells of pheochromocytoma line PC12 was confirmed. The different sensitivity of the 2 components to the recently discovered natural calcium channels blocker, CgTx, differentiated the 2 components. CgTx (10 µmol/liter) preferentially blocked only the steady

state component of the calcium current while the inactivated component was insensitive to CgTx up to a concentration of 50 $\mu\text{mol/liter}$. Figure 1; references 9: 1 Russian; 8 Western.

Endogenous Regulatory Oligopeptides: Structure, Function and Localization

907C0594B Moscow *ZHURNAL OBSHCHEY BIOLOGII* in Russian Vol 51 No 2, Mar-Apr 90 (manuscript received 18 Jul 89) pp 147-162

[Article by A. A. Zamyatin, Scientific Research Institute of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] A special data bank, EROP-Moscow, of endogenous regulatory peptides has provided the basis for a comprehensive analysis of the key structural and functional parameters of these biomolecules. Based on sequence studies and 50 percent similarity criteria the currently known peptides of vertebrate and invertebrate origin can be grouped into > 30 families. Of this number, approximately 20 families have been isolated from invertebrates. The majority of endogenous peptides with well-defined functions contain approximately 10 amino acids. Despite advances in SAR studies in general, definitive studies on the relationship between function and amino acid sequence in any given case have not been reported. However, it is clear that the basic aspects of ligand-receptor interactions in vertebrate and invertebrate systems are quite similar, if not identical. Recently information has become available that certain peptides are active in concentrations of less than 10^{-15} M, which suggests that initial reaction steps may involve $< 10^{-20}$ M concentrations of a peptide. The latter would signify single-molecule events which are below the level of detection by current analytical techniques. Tables 3; references 88: 20 Russian, 68 Western.

UDC 612.821.014.44.08

Efficiency and Space-Time Organization of Brain Biopotentials of Operators in Rhythmic Light Stimulation

907C0238C Moscow *KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA* in Russian Vol 23 No 4, Jul-Aug 89 (Manuscript received 27 Apr 88) pp 23-26

[Article by Ye. T. Petrenko]

[Abstract] A study is made of the influence of light stimulation at 12 Hz on the productivity of complex operator activity and on processes of intercentral integration of the functional systems of the neocortex with space-time organization of biopotentials. Studies were performed on 18 persons 18-28 years of age playing a difficult computer game requiring close attention, rapid information processing, visual-motor reactions, and precision. EEGs were recorded in eight neocortical areas.

The light stimulus decreased productivity in a statistically reliable fashion by 36 percent ($p < 0.05$), while increasing the density of EEG waves corresponding to the flicker frequency by 30-52 percent ($p < 0.05$). The light stimulus lead to a statistically reliable reduction of the spectral density of EEG waves ($p < 0.05$) in the 6-8 Hz band (by 21 percent). The coherence of the biopotentials of those frequencies dropped by 14 percent between the left frontal region and the motor apparatus for the muscles of the right hand and by 23 percent between the left lower parietal region and the motor centers for the right hand. The two hemispheres exhibited differences in the restructuring of frequency spectra and coherence functions. The frequency of the light stimulus has a considerable effect on the EEG of the motor regions in the left hemisphere, whereas the EEG of the frontal regions was affected in the right hemisphere. Frequency density at 6-8 Hz dropped more in the EEG of the left hemisphere motor region. Considerable changes were noted in the cross-spectra and coherence functions of the symmetry apparatus of the motor regions of both hemispheres. The light stimulus was found to cause significant disorders of interaction of motor areas in the neocortex between the hemispheres. Figures 1; References 14: 11 Russian, 3 Western.

UDC

612.82.018:577.175.522].014.46:[615.357:577.175.829]

Effect of Neuropeptide Y on Behavior and Dynamics of Noradrenaline Level in Brain

907C0280A *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY* in Russian Vol 108 No 8, Aug 89 pp 132-135

[Article by Ye. V. Borisova, G. Sabo, B. V. Zhuravlev and G. Telegdi, Laboratory of General Physiology of Functional Systems, Scientific Research Institute of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow; Institute of Pathophysiology of Szeged School of Medicine, Hungary]

[Abstract] An experimental analysis of the behavioral repertoire of rats after central introduction of neuropeptide Y and a simultaneous study of its effect on noradrenaline level in some rat brain structures involved experiments on 78 CFY male rats (170-200 g) in two series of experiments. Injection of an NaCl solution into control rats produced no significant variations in duration of orientational-investigatory behavior or in duration of rest periods (sitting quietly or lying) in the rats. Injection of 100 ng of the peptide greatly reduced the duration of orientational-investigatory behavior and increased the duration of rest periods without changing eating and drinking behavior. The second series of experiments showed no statistically significant deviations from normal noradrenaline level in the region of the frontal cortex and the septum before or after injection of 1 ng and 100 ng of the peptide. Some variations

of noradrenaline level were found in the region of the amygdala. There was some tendency to a reduction in noradrenaline level after injection of the peptide and a statistically significant increase of noradrenaline level after injection of 1 ng or 100 ng of the peptide; the increase was dose-dependent in the 1st 30 minutes. The behavioral effects registered after central injection of neuropeptide Y were attributed to activation of catecholamine systems of the diencephalon with greatest pronouncement in the hypothalamic region. Figures 3; references 9 (Western).

UDC 612.822:612.616-003.725

Interaction of Opioid Peptides and Monoamines In Respiratory Behavior Control Mechanism of Pulmonata: Analysis of Isolated Neurons

907C0156C Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 308 No 5 Oct 89 (Manuscript received 15 Feb 89) pp 1264-1269

[Article by T. L. Dyakonova]

[Abstract] Certain mollusks are used to study the cellular mechanisms of action of endogenous opioids. This article studies neurons related to the organization of the rhythmic moments of the opening and closing of the blow hole of the pulmonata. These neurons are characterized by repeated membrane potential waves synchronous with respiration through the blow hole. Results are presented from experiments indicating the participation of enkephalins in the mechanism of generation of the membrane potential waves that underlie the rhythmic motions. Under certain conditions, isolated respiratory neurons of the mollusk take on the properties of an endogenous oscillator and generate membrane potential waves that are similar to those observed in these neurons in situ during rhythmic respiratory motions. These results can facilitate an understanding of the natural neurochemical mechanism in the brain of the mollusk. The opioid peptides together with the monoamines play

a key role in the mechanism of generation of these rhythmic motions. Figures 4; References 7: 2 Russian, 5 Western.

UDC 591.089.612.8

Protein Synthesis Stimulation in Rat Cerebral-Cortex Hypoxia-Dystrophied Neurons Via Proliferation of Protein Activator Isolated From Nerve Tissue of Neonate Animals

907C0116A Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 308 No 3, Sep 89 pp 737-740

[Article by V. N. Vitvitskiy, A. V. Timonin, L. V. Cherkasova and L. V. Polezhayev, Institute of General Genetics imeni N. I. Vavilov, USSR Academy of Sciences, Moscow]

[Abstract] Stage-specific peptides and proteins which stimulated cell proliferation and DNA and protein synthesis in rat brain cells have been isolated at the Institute of General Genetics from intensely proliferating embryonal nerve tissue of the cerebral cortex and cerebellum of neonate rats, and one of them—a protein activator (A) with molecular mass of nearly 3000 daltons and pI 6.8—greatly stimulates protein synthesis. The capacity of this factor to stimulate protein synthesis in cerebral cortex neurons in vivo after direct introduction into the cortical parenchyma of adult animals, the neurons of which were preliminarily injured by hypoxia, was demonstrated. Determination of activity of protein synthesis in neurons and glia cells was performed autoradiographically and biochemically with the use of a scintillation counter in experiments on 104 adult female Wistar rats. The activator intensified protein synthesis abruptly in dystrophic neurons damaged by hypoxia. The effect lasted for 120 days after a single injection into animals suffering from hypoxia in specific parts of the brain. The effect of the factor on protein synthesis in dystrophic neurons resembles the effect of a transplant on cerebral cortex cells damaged by hypoxia. Figures 4; references 11: 9 Russian; 2 Western.

Reasons for High Infant Mortality in Turkmenistan

907C0674A Moscow SEMYA in Russian No 22,
28 May-3 Jun 90 p 6

[Article by Nikolai Filatov, special correspondent of SEMYA: "A Systemic Illness"; first and second paragraphs are source introduction]

[Text] Turkmenia: Ninety percent of children here are born full-term, 95 percent do not have congenital developmental defects, 100 percent are provided with infant milk preparations, but at the present time, one out of every twenty of their children dies before reaching the age of one year!

The high infant mortality rate in Turkmenia, as demonstrated by the intensive work done over the last year and a half by the Special Authorized Physicians of the Soviet Children's Fund/chief specialists of the USSR Ministry of Health and a summer mission is only the tip of the so-called "iceberg of problems" in the republic's health care. There are many reasons for this, and they are all closely interrelated. Perhaps the situation which has arisen in this region could be defined by a medical term: a systemic illness.

A systemic illness is an illness whose source is not in the damage of a particular organ, but in a profound, sometimes chronic disruption of the operation of the entire system of the body....

Quite probably, the question of the "chicken and the egg" in relation to the problems of the Turkmen health care sector and its interrelationships with the organs of Party and Soviet authority simply can't be solved at this point. And for this reason, Turkmen physicians, together with Special Authorized Physicians of the Soviet Children's fund/chief specialists of the USSR Ministry of Health (seven of them are now working in the republic), have placed the question "What is to be done?" at the top of the list, setting aside for the moment the question "Who's to blame?" And, incidentally, they have already accomplished a thing or two. Not only have the indices of infant mortality gone down sharply, but also the percentages for deaths of mothers in childbirth and for infectious diseases, including intestinal infections. However, these indices are still very, very far from the national averages.

Having traveled across half of Turkmenia, from Ashkhabad to Chardzhou, and having conversed with medical personnel of various levels—from ordinary treating physicians to directors of oblast health departments—we have obtained a rather clear picture of the causes of such a calamitous situation in child health care.

First. Everyone without exception, referred to the shortage of medical personnel. And not without cause. For example, in Mari Oblast, where 330,000 children live (30,000 of them one year or under), there should be 800 pediatricians, but there are a little over 330. The

extent of the shortage of pediatricians is practically the same in Chardzhou Oblast and especially in Tashauz Oblast.

"The reason is simple," explained Ch. Akyyev, chief pediatrician of the Mari Oblast Health Department. "They come here unwillingly from other republics, while our Turkmen Medical Institute only began to graduate pediatric specialists in 1978, and that, at 100 physicians a year, is just a drop in the bucket."

Second. The shortage of hospital beds. This should come as no surprise. It is enough to glance at this year's 12 May issue of TURKMENSKAYA ISKRA, where one can find in a report of the State Committee for Statistics of the TSSR the following statistic: "The construction of hospitals in the republic dropped 43 percent in the first quarter of 1990" (in comparison, of course, with the same indicator of the same period of the previous year). Of course, the situation varies in the various cities, districts, and oblast centers—here a little worse, there a little better, but on the whole the situation is very sad. This would be a good place to cite two or three "graphic" pictures from the life of, for example, the Mari Oblast Maternity Home, to tell of mothers in labor in the corridors and of rubbish pits almost outside the windows of the wards, to paint a picture of the oblast infectious-disease unit (for both adults and children), or to find just one precise epithet for the oblast gynecology department, located for some time in a one-story barracks of a former stable.... But is it really necessary? The reader, I would imagine, is long accustomed to this!

Third. The weak material-and-technical base of health care. Here the causes are painfully familiar: anything and everything is being switched to cost-accounting; the center allocates practically no equipment; there are not enough medications (as a result, incidentally, it is extremely difficult for physicians to adhere to the methods that have been worked out; in many regions, there are not even any bacteriology labs, and it is sometimes impossible to check the patient's sensitivity to an antibiotic, resulting in complications following treatment, etc. But this problem echoes especially painfully for the physicians themselves when there are no problems with suitable facilities or with qualified personnel. A splendid oblast children's hospital, a polyclinic, a new maternity home, and a gynecology department were recently built in Chardzhou. These were all situated in modern buildings equipped with air conditioners, and they were close to one another. As Chardzhou physicians and two Special Authorized Physicians of the Soviet Children's Fund/chief specialists of the USSR Ministry of Health for Chardzhou oblast—I. Boev and I. Davydov—explained to us, there was a good possibility of creating an oblast material and child protection center there. Incidentally, it could serve not only its own oblast, but neighboring ones as well. The fact is that the 400-bed children's hospital and especially the 500-visit polyclinic today stand half-empty. All they need is equipment and gear, but there's no money.

Fourth. Economy. Water is perhaps the greatest problem in Turkmenia. Deep artesian wells are an expensive and troublesome affair; for this reason, the population mainly uses water from irrigation canals and shallow wells. The ground and river water in them are, as a rule, highly saline and contain enormous amounts of pesticides and other chemicals. According to the statistics, only 20 percent of Turkmen water more or less conforms to the MPC (maximal permissible concentration) of the substances contained in it. The worst situation of all is in Tashauz Oblast, where on the average the water content of light metals, chlorides, and sulfates is 20-35 times higher than the norm.

Fifth. Because of life circumstances and the peasant's onerous lot, a woman in Turkmenia is placed in the most disadvantageous position. And that's precisely during the period of the most intensive child-bearing years. She must work in the field (it gets up to 50 degrees in the sun in the summertime), there is more than enough to take care of at home households are not small in Turkmenia), and she has all the washing and food preparation to do. And the children.... If a mother has eight or nine children, and one tot becomes ill (and the doctor insists that it be brought urgently to the hospital), with whom is this mother to leave the others? After all, they are one smaller than the other. So the mothers attempt to treat them at home....

Sixth. The negligence of doctors at the lower levels and inadequate skills. Here, too, one must speak with reservations (all we can seem to do is with reservations!); of course, lack of conscientiousness on the part of medical personnel is by no means a universal phenomenon in Turkmenia. But its scale could not remain unnoticed by the public. It is only a pity that the Turkmen doctors did not themselves first bring up this defect in their operation; who, if not they, should have sounded the alarm!

And this is not a full listing of the causes. Besides, the upper levels of management of the Turkmen health care sector know about them (this is no America that we have discovered).

"Some people believe," the first deputy minister of health of the TSSR, D. Tesler, told us, "that before the arrival of the authorized physicians and the missions, the Turkmen physicians, they say, did nothing and have only now bestirred themselves. That's untrue. The republic's health care sector deserves no small amount of credit for the small improvements which have been noted in the past three years. After all, you can't achieve a reduction in infant mortality in a single bound. It is the result of a major cooperative effort—and not just by physicians..."

The fact that not only the press, but also television and radio have begun to disseminate widely knowledge regarding hygiene, the rules of behavior during pregnancy, child-rearing principles, etc., is also testament to the fact that the problems of pediatric health care are at the center of attention across the entire republic. The Ministry of Health of the republic has wisely undertaken

family planning with an eye to increasing the time interval between births to 2.5 years. There are already results, although victory is a long way off.

As we can see, lowering infant mortality and handling the problems of pediatric health care in general are not the tasks of medicine alone. Just look at the issues that arise in this connection. What will happen when, as they say, the wave passes, and the passions subside a little (thanks to, suppose, a reduction in the notorious "per thousand" statistics, even if it's done in such a way that other republics become the country's "champions")? Won't everything backslide, in terms of the attitude of parents and doctors to the children? We are convinced that people must be made more responsible—doctors, parents, party and government workers—for children, not only before their own consciences, but also before the people and before the state, when all is said and done. But only a law on the rights of children can accomplish this. Alas, as sad as it may be, there are plenty of opponents of such a law. They put forward their arguments, sometimes quite weighty ones. But here's the question: Why, under rule of law, should the rights of children not be protected?

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Child Mortality Statistics, Medical Mission to Central Asia

907C0674B Moscow SEMYA in Russian No 22,
28 May-3 Jun 90 p 7

[Commentary by Aleksandr Baranov, Deputy Minister of Health of the USSR, member of the Board of the Soviet Children's Fund, under the rubric "Commentary": "We Need a Law Protecting Children"; title is quote attributed to Baranov]

[Text] "The country has long remained in blissful ignorance of how high our infant mortality rate is. Recently divulged statistics have shocked us all. The average figure for the country—22.6 children died in 1989 out of every 1,000 born—lags far behind the same indices for the developed countries of the world. But even that figure can be considered relatively favorable, if compared with infant mortality in the republics of Central Asia and Kazakhstan. Which is precisely why medical missions organized by the Soviet Children's Fund (SCF) and the USSR Ministry of Health are operating in that region.

"They turned out to be just what was needed to produce a positive effect in a relatively short period of time on the resolution of the problem not only of infant, but also maternal, mortality.

"In addition to the public response, the missions have produced a practical result. Last year, for the first time ever, the level of infant mortality from gastrointestinal diseases in the summer period was reduced in Central Asia. I believe this is also to the credit of the Authorized Physicians of the SCF/chief specialists of the USSR

Ministry of Health, who have now been working in this region for a year and a half. They were able not only to carry out short-term effort, but also to develop a long-term program aimed at improving pediatric health care in the republics.

"We have heard more than once that the medical missions are not the way out of this calamitous situation. It is possible that there is a grain of truth in such statements. But today we have only two means of reducing infant mortality. The first is to develop long-term programs which will produce positive results, but only in the remote future. The second is to undertake urgent measures right now. We have chosen this path, and we already are seeing the positive results of the work done by the physicians participating in the missions.

"However, it would be a blunder to believe that the medical mission has found its definitive form. Much is changing and will continue to change in its structure and its directions. If, in the past, medical brigades were formed by ministerial orders, we have now decided to run a competition among physicia-volunteers. The winners will work on the staffs of the missions, and their labor will be rewarded not only morally, but also materially.

"I am convinced that the infant and maternal mortality in our country is not merely a medical problem. Other problems which give rise to this mortality must be solved along with it: economic, ecological, social.... We need a law which would be capable of protecting both mother and child, and not separate acts and decrees. Only such a law will be capable of saving our children, the country's future!"

Number of Children Who Died Before 1 Year of Age Per 1,000 Births

	1980	1984	1985	1986	1987	1988	1989
USSR	27.3	25.9	26.0	25.4	25.4	24.7	22.6
RSFSR	22.1	20.9	20.7	19.3	19.4	18.9	17.7
UkSSR	16.6	15.9	15.7	14.8	14.5	14.2	12.9
BSSR	16.3	15.1	14.5	13.4	13.4	13.1	11.7
Uzbek SSR	47.0	45.1	45.3	46.2	45.9	43.3	37.8
Kazakh SSR	32.7	30.7	30.1	29.0	29.4	29.2	25.7
Georgian SSR	25.4	23.9	24.0	25.5	24.3	21.9	19.6
Azerbaijan SSR	30.4	30.3	29.4	30.5	28.6	27.0	26.0
Lithuanian SSR	14.5	13.4	14.2	11.6	12.3	11.5	10.7
Moldavian SSR	35.0	32.7	30.9	26.4	25.9	23.0	20.5
Latvian SSR	15.4	12.9	13.0	13.0	11.3	11.0	11.2
Kirghiz SSR	43.3	40.9	41.9	38.2	37.8	36.8	32.6
Tajik SSR	58.1	49.4	46.8	46.7	48.9	48.9	43.4
Armenian SSR	26.2	23.9	24.8	23.6	22.6	25.3	20.1
Turkmen SSR	53.6	51.2	52.4	58.2	56.4	53.3	54.6
Estonian SSR	17.1	13.6	14.0	16.0	16.1	12.4	14.7

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Morbidity and Mortality Rates Among the Population From Tuberculosis

907C0692A Moscow VESTNIK STATISTIKI
in Russian No 2, Feb 90 pp 63-64

[Text] At the beginning of 1989, some 603,000 patients were on the books at treatment institutions as having active tuberculosis. The change in the morbidity and mortality rates from tuberculosis is characterized by the following data:

[Unattributed article]

	1988, as a % of			
	1988	1985	1986	1987
Active tuberculosis registered (with diagnosis established for the first time)				
thous. of individuals	119.8	94.5	95.5	96.8
per 100 thous. population	42.0	91.9	93.8	96.1
among them, tuberculosis of the respiratory organs				
thous. of individuals	107.5	94.5	95.6	96.7
per 100 thous. population	37.7	92.0	93.8	95.9
Number who have died, all forms of tuberculosis				
thous. of individuals	21.8	83.9	98.3	99.2
per 100 thous. population	7.6	80.9	96.2	97.4
among them, tuberculosis of the respiratory organs				
thous. of individuals	20.1	83.5	98.2	99.5
per 100 thous. population	7.0	80.5	95.9	98.6

Morbidity was 1.4 times greater among the rural than among the urban population. Of the total number of those with a diagnosis of active tuberculosis established for the first time, two-thirds were men; almost one-half were individuals from 20 to 40 years of age. In this age group, among those ill with tuberculosis of the respiratory organs, more than 40 percent were carriers; this group consisted mainly of alcoholics and vagrants. The illness is detected in a neglected form in more than one-third of all patients as the result of the inadequacy of preventive examinations.

Kazakhstan has had a high level of morbidity for many years. In 1988, it amounted to 74 cases per 100,000 population, which is 1.8 times higher than in the country as a whole. This index also exceeds the national average by 10-26 percent in Azerbaijan, the republics of Central Asia, and Moldavia.

In 1988, some 17,600 blue-collar workers, white-collar workers, and collective farm workers ill with tuberculosis were put on disability; the level of disability was 1.3 per 10,000 workers among the blue-collar workers and white-collar workers, and 2.1 among the collective farm workers. It was high among blue-collar workers and white-collar workers in Kazakhstan, Uzbekistan and Turkmenistan (1.5-2 times higher than the national average), and among collective farm workers in Uzbekistan, Tajikistan, and the RSFSR, it exceeded the national average by 10-14 percent. Half of the total number of those on disability as a result of tuberculosis were 45 years of age or under.

Despite the steadily declining number of deaths from tuberculosis, the mortality rate is 2-10 times higher than in Japan, France, the FRG, Great Britain, and the United States. The mortality rate among the rural population from this cause is 1.3 times higher than among the urban population and even higher in the age group of 50 or under.

Tuberculosis is the cause of death among men 4.5 times more often than among women. This difference increases with age in the age group of 30-39, the mortality rate among men is 6 times higher than among women; in the 40-49 group, 8 times higher.

In Azerbaijan, the Ukraine, Turkmenistan, and Kazakhstan the mortality rate associated with tuberculosis exceeded the overall national level by 11-41 percent.

At the same time, the number of beds for tuberculosis patients decreased by 16 percent in 1981-1988; the number of medical phthisiotherapists, by 11 percent; in Lithuania, Tajikistan, Uzbekistan, Moldavia, and Estonia, the number of beds decreased by 24-36 percent; in Belorussia, Moldavia, Estonia, and Georgia, the number of physicians decreased by 20-22 percent.

At the present time, the number of beds in the Ukraine, Estonia, Georgia, and Belorussia is one-third lower than the norm; Armenia, one-half lower. Tuberculosis dispensaries are poorly equipped: almost half of them have no fluorography rooms, and 7 percent have no x-ray rooms.

The material-and-technical base of the tuberculosis facilities is in unsatisfactory condition. Thus, for example,

only 46 out of 180 tuberculosis dispensaries in Kazakhstan are located in standard facilities. A number of measures have not been carried out for the construction of a tuberculosis hospital in Alma-Ata, a regional tuberculosis dispensary in Shevchenko, and tuberculosis sanatoria in Guryev and Semipalatinsk oblasts.

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New Method for AIDS Diagnosis, Prevention Center in Kiev

907C0727B Kiev PRAVDA UKRAINY in Russian
12 Jun 90 p 4

[Article by G. Androshchuk: "It Is High Time to Join Forces," published under the rubric "Continuing Discussion"]

[Excerpt] Just three years ago, the first AIDS patient was identified in the USSR. Today, there are already 482 patients infected with the HIV virus, including 29 who have developed the full-fledged disease. Nineteen patients have died, including four in the Ukraine. According to estimates by scientists, more than 1,600 people have been infected with the virus by the end of 1990; in 1991 this figure will rise to 6,200. The "arithmetic" of epidemic is simple. There is no addition—only multiplication. By the end of the decade, 1-1.5 million AIDS carriers and over 30,000 gravely ill patients are to be expected.

Recently, the National Parliament passed a law entitled "On Prevention of AIDS," which raises the level of responsibility of medics for prevention of the spread of the infection. The USSR Council of Ministers has been ordered to form a government commission on prevention of the disease. This commission is to undertake arrangements for material and technical support for the fight against the virus, fund the research, disseminate information and conduct ethical education of the population. In following the example of many developed nations, our republic is creating a national program for waging war against this "plague of the twentieth century." We leave it to the reader to judge how effective these efforts are.

On the basis of the Kiev Scientific Research Institute of Epidemiology and Infectious Disease imeni L.V. Dromashevskiy, a center for the Ukrainian Republic has been set up for prevention and prophylaxis of AIDS. In a joint effort with the Institutes of the Academy of Sciences of the Ukrainian SSR, Kiev State University and other organizations, it has embarked on an effort to deal with this important issue.

"So far, this is just a new name, a new office," said V.I. Shestakov, the deputy chief state sanitary physician of the Ukrainian SSR. "So far, the best forces have not been brought together and there is no modern equipment. This reorganization can only be seen as another bureaucratic game. The center needs new real assistance."

Upon the initiative of the Ministry of Health of the Ukrainian SSR, a Ukrainian Republic foundation for donations to fight AIDS has been created. A recent meeting of the activist group of medical professionals adopted a petition addressed to the leadership of the ministries, agencies, work collectives, public organizations and all citizens of the republic, appealing to them to take the initiative and demonstrate their belief in the ideas of humanism and charity by making donations.

As far as I can recall, a similar fund was already established. Indeed, it looks as if the right hand does not know what the left hand is doing. In November of 1989, the Ukrainian Republic "Anti-AIDS" center was set up by the Central Committee of the Ukrainian Red Cross Society. It is a self-accounting organization with separate production units and a staff of about 80 people.

"Our main objectives," said A.A. Berezkin, a director of the center, "is buying and manufacturing disposable medical equipment, financing scientific research, bringing together individuals who want to offer material and other possible help in the fight against AIDS, coordination of the actions of other charitable organizations, both Soviet and foreign, in blocking the spread of the disease. Considerable assistance in this effort has been given by the editors of the magazine UKRAYNA. The center takes part in all kinds of preventive activities, creation of a centralized pool of medical equipment, drugs, and public insurance and incentives funds. A foreign currency bank account has been opened, and advertisements have been published. Several cultural projects have been started and contracts have been signed with foreign partners for supply of disposable needles and systems. For those wishing to support the center's activities, our bank account is No. 700820 MFO 0322227, Leninsk Branch, Promstroy Bank, Kiev."

In Nikolayev, a fresh approach to this problem has been adopted. The oblast executive committee and oblast health department have initiated the interagency Miloserdie [charity] Association. Its membership includes some 40 enterprises and organizations in the oblast. A foreign currency account is to be opened, and there are plans to create a center for AIDS diagnosis and prevention and to arrange for manufacture of disposable products.

Thus, everyone is trying to do what they can. Inventors and scientists are also contributing. A group of inventors from the Odessa self-financing firm APROS of the Foundation for Assistance of Inventors' and Innovators' Activities, led by V.V. Kostyushov, candidate of medical sciences, has developed a new and effective method for AIDS testing and a computer technology for clinical laboratory workups and immunodiagnostics [LABARM].

Unlike the conventional tests that require a 3-5 ml venous blood specimen, the use of a large number of disposable syringes, needles and test glass plates, centrifuges and refrigerators for transportation and storage of

serum, this new method requires none of that. It is much more accurate and reliable, takes much less work and allows the specimens to be kept and transported at room temperature. A positive decision has been received from the State Committee for Inventions to grant an author's certificate covering this invention. In combination with a computerized system of laboratory analysis, the method reduces the time of clinical-immunologic test and immunodiagnoses of AIDS by a factor of 20(!). It completely eliminates unproductive routine work for medical personnel for maintenance of medical documentation (processing, analysis, medical statistics and keeping reporting/analytic information). It is suitable for expert evaluation of the patients and can increase the capacity of laboratories to 5,000 tests per day. V.V. Kostyushov sits down at a computer, and within minutes the results of a test appear on the computer screen. Conventional methodology would require 2-3 days of work by a laboratory assistant to achieve the same result.

One can say with certainty that LABARM is at the cutting edge of medical informatics and technology. It is no accident that specialists from Poland, Hungary, Bulgaria and Finland have shown lively interest in this Soviet product. And yet, in this country ... there is only one copy of it.

Historically, the fight against epidemics was considered to be of an equal importance with defending the fatherland against invasion. It is only by joining efforts that we will be able to reduce the scale of the onslaught of this epidemic. AIDS takes no time off!

UDC 613.161:616-053.4.5

Effect of Polluted Air on Children's Health

907C0265C Tashkent MEDITSINSKIY ZHURNAL
UZBEKISTANA in Russian No 6, Jun 89 (Manuscript
received 8 Feb 88) pp 29-32

[Article by A. S. Babadzhanov, Scientific Research Institute of Sanitation, Hygiene and Occupational Diseases, Uzbek Ministry of Public Health]

[Abstract] Parents of preschoolers and school-aged children in two areas with greatly differing air pollution conditions were questioned concerning the health of their children. Complaints of the unhealthful effect of air pollution were twice as common in the more polluted area. In the polluted area, 8.7 percent of children were born after anomalous pregnancies, 10.2 percent experienced complications at birth, and 2.1 percent were born prematurely. In the control area there were very few such problems. The studies thus confirmed the assumption that industrial pollution has an unfavorable influence on the health of children.

UDC 616-006-08-039.57.003.1

Economic Aspects of Outpatient Treatment of Oncology Patients

907C0192A Moscow ZDRAVOOKHRANENIYE
ROSSIYSKOY FEDERATSII in Russian No 6,
Jun 89 (Manuscript received 12 Nov 87) pp 21-24

[Article by Yu. A. Arkhipov, Omsk Medical Institute]

[Abstract] Outpatient treatment is generally less expensive than hospital treatment, but no specific expression for computation of this difference has yet been developed. This article suggests simple equations for determining the cost of the outpatient treatment of cancer patients. Outpatient rehabilitative treatment is found to be considerably less expensive than hospital treatment: in patients with breast cancer the difference is a factor of five; in patients with stomach cancer, a factor of three; in patients with intestinal cancer, a factor of 2.8. The savings gain is still greater if the cost of fixed capital is included. Outpatient rehabilitative treatment of oncology patients in the early stages of the disease is also favorable from the standpoint of medical and socio-occupational rehabilitation. References 3: Russian.

UDC 617-089-039.57].003.17

Economic Aspects of Polyclinic-Based Surgery

907C0192B Moscow ZDRAVOOKHRANENIYE
ROSSIYSKOY FEDERATSII in Russian No 6,
Jun 89 (Manuscript received 24 Feb 88) pp 24-26

[Article by B. G. Apanasenko, A. N. Nagnibeda, Yu. S. Savelev, A. D. Shiryayev, Leningrad State Scientific Research Institute of Emergency Medicine imeni I. I. Dzhanelidze]

[Abstract] Many recent studies have computed the economic impact of measures intended to improve medical services to the public. The question of providing an economic foundation for increasing surgical activity in polyclinics is important in these days of perestroyka. This is particularly true of Leningrad, where the health care service is experiencing serious difficulties in treating persons requiring relatively average surgical procedures, such as those for varicose veins, stomach hernias, Dupuytren's contracture, intestinal polyps, and thrombosed hemorrhoids. Between 1984 and 1986, the polyclinics of Leningrad performed surgery on 916 patients for such problems; 600 more were performed in 1987. A savings of more than 80,000 rubles was effected in 1986-1987 alone. Patients much prefer polyclinic surgery, because it avoids the long wait for hospitalization. Women particularly appreciate not having to spend time in the hospital away from home. The expansion of polyclinic surgery, in spite of its obvious economic effectiveness, requires strict consideration of all contraindications.

UDC 614.2:616-082.4

Day Hospitals as Integral Component of Clinical Facilities

907C0758A Moscow SOVETSKOYE
ZDRAVOOKHRANENIYE in Russian No 2,
Feb 90 (manuscript received 8 Apr 88) pp 12-18

[Article by A. Ya. Ladnyy, Ya. P. Bazilevich, I. Ya. Rafalyuk, Ya. R. Nakonechnyy, G. P. Zubarev, M. G. Telishevskiy, Ye. N. Polatayko, Ye. N. Postoyenko, O. F. Liman, I. N. Chaklish and B. D. Voloshin, Department of Health, Lvov Oblast; Lvov Medical Institute]

[Abstract] Day hospitals began to be established at various polyclinics in the Lvov Oblast in 1981, a practice that has met with general approval in Ukraine and in the USSR in general. Such facilities have been shown to be of special value in districts where hospital facilities are inadequate or lacking. Experience has shown that some 23.5 percent of hospital cases can easily be handled at day hospitals, and that 36.3 percent of occupational health-related cases fall into the same category. Most of the day hospitals concentrate on a single specialty—usually diagnostics and therapeutics—although comprehensive multispecialty day hospitals are now being founded. Quite a few of the day hospitals now operate on a round-the-clock basis. The case profile consists of 78.9 percent employed, 48.6 percent women, 51.4 percent men, 12.1 percent aged, 42.6 percent cardiac cases, 32.2 percent gastroenterology cases and 9.8 percent respiratory diseases. Discharge statistics show clinical improvement in 96.2 percent of the cases, 3.4 percent unchanged, and 0.4 percent requiring further management in a hospital setting. Cost effectiveness assessment at one at hospital yielded an impressive figure of 145,000 rubles. Factor hindering more extensive application of the day hospital concept are lack of proper physical facilities, financing problems, lack of equipment, supplies and drugs, and a managerial infrastructure. References 9 (Russian).

UDC 614.2:616.85-084

Automatic Screening for Neurotic Disorders in Mass Screening Programs

907C0758B Moscow SOVETSKOYE
ZDRAVOOKHRANENIYE in Russian No 2,
Feb 90 (manuscript received 8 Dec 87) pp 54-56

[Article by G. F. Yemelyanov, professor, and S. V. Vasilyeva, Dnepropetrovsk Medical Institute]

[Abstract] A system has been devised for computer-based screening for neurotic conditions within the framework of a mass screening program, based on analysis of the results of 13 tests involving 44 standard responses. Trials conducted with 515 neurotic patients and a comparison group of 207 health subjects showed

the system to have a diagnostic accuracy of 85-89 percent. Accordingly, within the scope of mass screening, the subjects can be categorized into healthy, at risk, and clinically suspect groups. In comparison with conventional diagnostic procedures automatic screening reduced the cost of the workup 2.5-fold and the number of examinations by a physician by 80 percent.

UDC 616-084.3(574)

Preparation of Health Establishments for Mass Screening in Kazakhstan

907C0759A Moscow SOVETSKOYE
ZDRAVOOKHRANENIYE in Russian No 4,
Apr 90 (manuscript received 4 May 89) pp 6-10

[Article by P. P. Petrov and T. K. Kalzhekov, Scientific Research Institute of Regional Pathology, Kazakh SSR Ministry of Health, Ama-Ata]

[Abstract] As part of a health survey to assess the readiness and attitudes of 131 physicians and 220 allied health personnel toward mass screening, an analysis was conducted on health statistics before and after mass screening in an urban and rural locations in Kazakhstan. Extensive health statistics showed that implementation of mass screening in the city of Kentau, Chimkent Oblast, and the Zerendinskiy Rayon, Kokchetav Oblast, led to an increase in reported morbidity patterns between 1977 and 1986, reflecting more comprehensive medical coverage of the population in urban and rural settings. The increase was attributed to both, a higher index of suspicion on part of the medical personnel and greater health education of the population. The study also revealed areas where improvements need to be implemented, including provisions for postgraduate training for physicians and enhancement of diagnostic instrumentation and expertise in Kazakhstan. References 3 (Russian).

UDC 616.89-008.441.13:616-036.88]:312.6

Alcohol Abuse and Mortality Patterns in 40-54 Year Old Men

907C0759B Moscow SOVETSKOYE
ZDRAVOOKHRANENIYE in Russian No 4,
Apr 90 (manuscript received 23 Mar 89) pp 15-18

[Article by K. V. Markov, A. N. Britov and I. A. Vedeneyeva, All-Union

[Abstract] An analysis was conducted on the relationship between alcohol intake and mortality patterns in 40-54 year old men, in part to assess effectiveness of anti-alcoholism campaign promulgated by the CC CPSU in 1985. The study encompassed 5555 working men in Cheboksary, monitored for a 9 year period (1978-1986.) During that time there were 426 deaths, with 35.4 percent of the deaths in 1978-1985 attributable to suicide, accidents and trauma. In addition, the data also

revealed that 76.8 percent of all deaths involved inebriation, while alcohol intoxication was directly responsible for 11.3 percent of the deaths. In addition, ischemic heart disease was responsible for 20.9 percent of the deaths, malignancies for 17.8 percent, cerebrovascular diseases 8.7 percent, and respiratory conditions, including tuberculosis, 8.0 percent. In 1986, after an extensive anti-alcohol campaign in 1985, the number of deaths from suicide, accidents and trauma dropped to

18.9 percent, and mortality fell to 6.66/1000 versus an overall figure of 8.75/1000, i.e., a 31.4 percent reduction. The data also demonstrated a reduction in the number of drinkers from 91.8 to 80.7 percent in 1986, and an increase in abstainers from 2.0 to 10.2 percent. These findings support the efficacy of the anti-alcoholism efforts in 1985-1986 at the level of the target population, with indications that such programs must be continued. figures 1; tables 2; references 5: 3 Russian, 2 Western.

Regulating the Efficiency of the Individual and the Psychometrics of Fatigue

907C0393B Moscow *PSIKHOLOGICHESKIY ZHURNAL* in Russian Vol 10 No 5, Sep-Oct 89 pp 81-86

[Article by G. A. Stryukov, T. N. Dolgolenko, and M. A. Gritsevskiy]

[Abstract] The connection between short-term memory load and rate of fatigue development was studied. As a result of the experiments conducted, the dynamics were traced in terms of the functional capacities of short-term memory during its continuous, heavy use. Test subjects were given homogeneous assignments in which they were to hold sequences of 4, 5, and 6 numbers in their memory for 5 seconds, and then reproduce information called for by a "probe." Nine students participated in 36 experiments. An electrocardiogram was connected to the students, and the data obtained were used to assess the

dynamics of pulse rate. After 2 hours of continuous work, all of the participants were fatigued. The reluctance of most of them to participate in another set of similar experiments pointed to the difficulty and fatiguing nature of the tasks. It was determined that at the most difficult level of work, recalling six figures, the participants had reached the maximum functional capacity of short-term memory. The quality of activity noticeably decreases in proportion to the difficulty of the task. The inability to continuously maintain the level of attention necessary for 100 percent effectiveness of activity was not due to a lack of desire. The two basic types of limitations in the work of the CNS physiological mechanisms and the mental functions associated with them are discussed. It is believed that the limitations have an active, regulatory function designed for protection. More sensitive indicators of mental work capacity need to be sought. Figures 2, references 12: 9 Russian, 3 Western.

"Ekosorb" Consortium Created to Coordinate Enterosorbent Production

907C0709 Kiev PRAVDA UKRAINY in Russian
25 Apr 90 p 3

[Article by V. Petrenko: "Hope Is Becoming Reality"]

[Abstract] An article published 14 October 1989 in PRAVDA UKRAINY described a "round table" discussion of representatives of chemical science and the republican public health service who exchanged opinions concerning problems and prospects of increasing industrial output and extending practical use of various medical sorbents developed by Ukrainian sciences and discussed the delay in solving the problem of organization of sorbent production. V. Petrenko interviewed head of the Department of Sorption and Precision Inorganic Synthesis of the Institute of General and Inorganic Chemistry, USSR State Prize Laureate V. V. Strelkov and candidate of technical sciences Yu. M. Sidorenko to learn what changes are occurring in this area. The "Ekosorb" consortium has been created. It unifies almost 20 Soviet participants from science, industry, construction and financial institutions for industrial output of sorbents. Beginning 5 May 1986, tests of enterosorbents used to prevent accumulation of radionuclides in the organism and ensure their prompt excretion were conducted. Use of enterosorbents on Chernobyl Atomic Energy Power Plant workers and some Kievans decreased accumulation in the organism of iodine, tellurium, lanthium and other short-lived radionuclides 4-6 times. Attempts are now being made to give enterosorbents properties which would permit selective absorption of long-lived radionuclides, cesium and strontium. The importance of increasing output of sorbents preparation and universal introduction of them in medical practice was emphasized. Means of financing production were discussed. The "Ekosorb" consortium is now producing about 2 tons of enterosorbents per year while vastly greater amounts are needed to treat people in contaminated regions. General purpose sorption filters for individual use to remove heavy metals, pesticides and radionuclides from drinking water are being used as are devices for removing radionuclides from milk.

UDC 612.017.1.014.482.014.46:616.285.7

Change in Certain Characteristics of Cellular Immunity in Rats With Chronic Radiation-Chemical Injury

907C0212A Moscow GIGIYENA I SANITARIYA
in Russian No 7, Jul 89 (Manuscript received
04 Feb 88) pp 16-19

[Article by V. L. Shvedov, G. G. Anisimova, Institute of Biophysics, USSR Ministry of Health, Moscow]

[Abstract] Very few publications have studied the combined influence of radiation and nonradiation factors on the immune system. This article studies the phagocytic function of blood neutrophils in rats chronically exposed to gamma radiation in combination with chlorphos or

lindane. The pesticides were found to have the primary effect on phagocytosis in the experiments, which continued over a period of one year and were performed on white rats starting at an age of 3.5-4 months. The combined effect is less than additive, although during certain periods of the experiment, additive and more-than-additive effects were observed. Figure 1; References 8 (Russian).

UDC 614.31:614.876]-07

Determination of Isodose β -Activity of Radionuclide Mixture in Food Products

907C0212B Moscow GIGIYENA I SANITARIYA
in Russian No 7 Jul 89 (Manuscript received 29 Feb 88)
pp 38-40

[Article by O. N. Prokofyev, Leningrad Scientific Research Institute of Radiation Hygiene, RSFSR Ministry of Health]

[Abstract] β -Radiometry is the most accessible method of determining the content of radionuclides in food products. The β -activity of a mixture of radionuclides in a food product can be used to determine the levels of internal irradiation of the organs of a person consuming the product. The isodose β -activity of a mixture of radionuclides in a food product refers to the β -activity for which the radiation dose acting on a person consuming a given amount of the food is equal to a certain fixed value. The isodose β -activity of a mixture of radionuclides in a food product depends on the composition of the mixture, the degree of accessibility of the radionuclides for assimilation by the body, and the conditions of consumption of the food product. This article presents equations for computation of the isodose β -activity of food products. Input data concerning the composition of radionuclides in the food products can be obtained by γ -spectrometry and radiochemical analysis of specimens. References 3: 2 Russian, 1 Western.

UDC 614.876-07

Fast Method of Determining Specific Radioactivity of Environmental Objects

907C0212C Moscow GIGIYENA I SANITARIYA
in Russian No 7 Jul 89 (Manuscript received
20 May 88) pp 40-42

[Article by K. V. Voronin, O. N. Karklinskaya, A. A. Kozlov, A. I. Sobolev, Central Order of Lenin Institute for Postgraduate Medicine, Moscow]

[Abstract] An attempt is made to develop a fast method for determining the specific γ radioactivity of environmental objects from the dose exposure rate. The method is based on construction of an empirical functional equation relating radioactivity and dose rate by means of the theory of mathematical statistics. It is demonstrated that for purposes of rapid estimation, the functional relationship between specific γ activity and exposure dose rate can be described linearly. Figures 1; References 2 (Russian).

UDC 619:614.47:616.988:636.22/.28

Vaccine Against Adenovirus Infection of Cattle*907C0264A Moscow VETERINARIYA in Russian No 9, Sep 89 pp 23-25*

[Article by R. V. Belousova, Moscow Veterinary Academy]

[Abstract] Adenovirus infection in calves is usually acute and damages the organs of respiration, digestion, and vision and the lymph tissue, with 70-80 percent of animals falling ill within 10-14 days. In some farms of the USSR, 7 to 13 percent of calves die of the disease. Live and inactivated vaccines are used abroad, and a bivalent inactivated vaccine has been developed in the USSR. This article presents the results of production testing of the preparation on a farm. The testing entailed utilizing several series of the vaccine based on two domestic epizootic strains of cattle adenovirus. Two inoculations with the inactivated bivalent vaccine were found to be effective. The vaccine retains its activity and effectiveness. Immunity arises two weeks after vaccination and lasts for at least six months. References 10: 6 Russian, 4 Western.

UDC 619:576.807.7

Adjuvant Effect of Synthetic Glycopeptide in Experiments With Viruses*907C0264B Moscow VETERINARIYA in Russian No 9, Sep 89 p 34*

[Article by A. I. Sobko, A. P. Starcheus, V. I. Polulyakh, and O. F. Blotskiya, Ukrainian Scientific Research Institute of Veterinary Medicine]

[Abstract] A technology has been developed for producing highly active, specific diagnostic sera for the diagnosis of transmissible and enteroviral swine gastroenteritis, and immunostimulating preparations have been tested. There is great interest in substances with an adjuvant effect influencing the immunologic status of the organism, such as muramyl dipeptide, which, however, has some residual pyrogenicity. The Institute of Bioorganic Chemistry imeni M. M. Shemyakin has created a glycomuramyl dipeptide that has less pyrogenicity, but greater immunostimulating activity. This article studies the comparative effectiveness of the new substance, an inorganic adjuvant, and Freund's adjuvant in hyperimmunization of rabbits. It was found that the new preparation is safe, with no side effects. A nonspecific stimulating effect was also observed, with improved general condition and increased appetite and body mass. References 4 (Russian).

UDC 632.954:578.828.085.2

Effects of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin on HIV Replication in Lymphoid Cell Culture

907C0019B Moscow DOKLADY AKADEMII NAUK
SSSR in Russian Vol 313 No 3, Jun 90 (manuscript
received 4 Feb 90) pp 723-725

[Article by A. G. Pokrovskiy, A. I. Chernykh, S. R. Chaplygina, O. N. Yastrebova and I. B. Tsyrov, All-Union Scientific Research Institute of Molecular Biology, Koltsovo, Novosibirsk Oblast; Institute of Clinical and Experimental Medicine, Siberian Department, USSR Academy of Medical Sciences, Novosibirsk]

[Abstract] In view of the fact that AIDS involves suppression of helper T lymphocytes and the environmental pollutant dioxin has also been shown to exert a similar effect, an in vitro study was conducted to determine whether 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) affects HIV replication. Studies with MT-4 culture, a lymphoid line highly susceptible to HIV, showed that TCDD markedly enhanced reverse transcriptase activity as well as accumulation of HIV-1 proteins in cells with a primary HIV-1 infection. In addition, addition of TCDD to EVK-IRA/3 lymphoid cells with a persistent HIV-1 infection increased virus production by 20-30 percent. As yet, the mechanism of action of TCDD in enhancing HIV-1 replication remains unclear, although it may involve induction of proteins that lead to trans-activation or affect selected processes involved in viral reproduction. Figures 2; references 14: 1 Russian, 13 Western.

UDC 578.828

Effects of T4 Receptor and Class II HLA Analog Peptides on HIV Replication

907C0019C Moscow DOKLADY AKADEMII NAUK
SSSR in Russian Vol 313 No 3, Jun 90 (manuscript
received 1 Feb 90) pp 737-740

[Article by A. G. Pokrovskiy, V. M. Blinov, O. N. Yastrebova, S. R. Chaplygina, I. N. Yegoricheva, L. S. Sandakhchiyev, corresp. member, USSR Acad. Sci., A. T. Kozhich, S. A. Moshnikov, L. D. Chikin and V. T. Ivanov, academician, All-Union Scientific Research Institute of Molecular Biology, Koltsovo, Novosibirsk Oblast; Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] In view of the molecular similarity between T4 receptor, class II HLA, and HIV proteins, a study was designed to test whether appropriate peptide analogs of the sequences in question would affect HIV replication in MT-4 cell culture. Accordingly, the following HIV analogs were prepared by solid-phase synthesis for testing: g90 (547-559 env), g92 (557-573 env), g93 (43-53 vpu), g94 (92-107 gag), g96 (419-430 env), g97 (427-439 env), and g98 (68-81). The results demonstrated that the greatest degree of inhibition of reverse transcriptase and accumulation of viral proteins in HIV-1 infection was obtained with g97 and g98. Both peptides exceeded peptide T in activity. Peptides g92 and g94 were less potent but equivalent in activity to peptide T. The results indicate that the effective peptides bind to T4 receptors, thereby blocking binding of HIV-1. Tables 1; references 15: 3 Russian, 12 Western.

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